

Community Based Comprehensive Planning for a Capital Township, Uttaranchal.

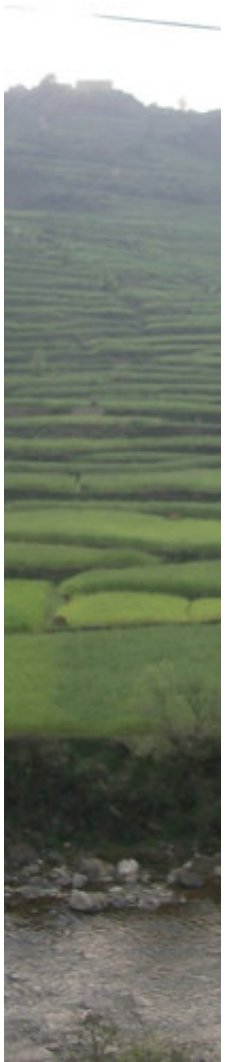
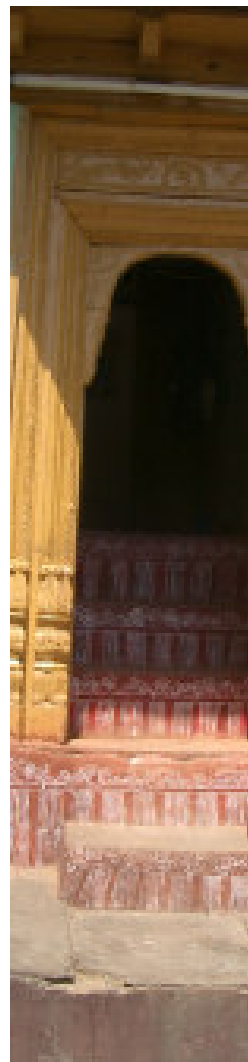
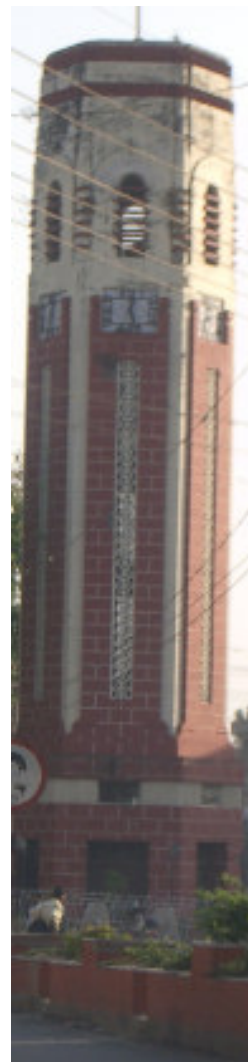


Environics Trust, New Delhi

October 2005.

Emmanuelle. Pedeutour, Town planner, Paris.

Ashok.Bhairi, Architect & Urban Designer, India.





Acknowledgments:

We are very much thankful to Dr. Sreedhar for his constant support and guidance during the project to understand the various issues of Uttarakhand and the different perspectives of Urbanization in Mountain region.

We also thankful to A&D organization, Mrs. Preeti, and Mrs. Radha for giving us the opportunity to work for this unique project.

Our sincere thanks to Prof.KB Jain, and Ms.Sarika Mittra for their contribution to our study with their previous documentation and research about Capital issue of Uttarakhand respectively.

Our thanks to Mr.Nishant, Mrs. Vanita for their valuable suggestions and discussions about the project.

And finally, we would like to acknowledge those who helped us with interviews during our trips to Gairsain, Dehradun, Nainital and other places in Uttarakhand.

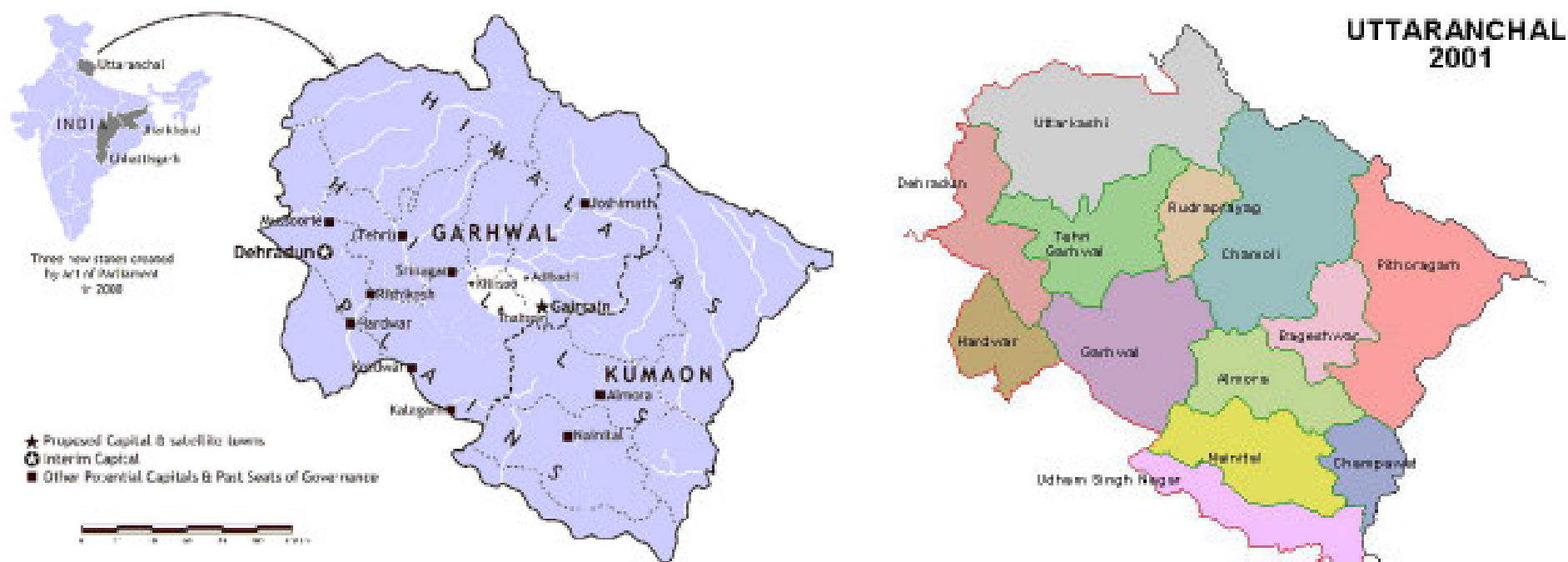
1. Introduction	01
2. Aim of the Study	01
3. Objectives	01
4. Understanding the State, Uttarakhand	01
a. Population and Demography	01
b. Physical setting of the State	02
c. Physiology	02
d. Climate	02
e. Soils	03
f. River Systems	03
g. National Parks and Sancturries	04
h. Geology	04
i. Landform	05
j. Earthquake History	05
5. Urbanization	05
a. Hill Stations- Common Characteristics	05
b. Urbanization in Uttarakhand	06
6. Infrastructure	07
Constraints on Developments	07
Transport	07
7. Today's Context in Uttarakhand	08
8. Dehradun - interim Capital	08
a. Evolution and Growth	08
b. Land use	08
c. Existing Scenario- Impact of Urbanization	09
9.Nainital	12
a. Evolution and Growth	12
b. Tourism	13
c. Landuse	13

d. Existing Scenario	14
10. Architecture and Urbanization Scenarios in Uttarakhand	15
11.Issue of Capital	19
12.Dudhatoli Region	19
a. Centrality	20
b. Connectivity	20
c. Seismic zone	20
d. Land availability and value	20
e. Topography and climate	21
f. Water and electricity	21
g. Historical association	21
h.Construction materials	21
13. Gairsain:	21
a. Land use and Settlement pattern	21
b. Climate	22
c. Temperature	22
d. Rainfall	22
e. Humidity	22
f. Drainage Pattern	22
g. Slope and Topography	22
h. Soils	22
i. Earthquake risks	22
j. Population Characteristics of Gairsain	22
14.Scenarios of the Regional Capital, Chandra Singh Nagar	23
15. Decentralization: Definition and Conceptual issues	23
16. Capital activities and its decentralisation	23
17. Macro plan	24
a. Classification of Hill Stations	24
b. Valley Settlements	24
c. Hill top Settlements	25
d. Spur	26
e. Gaps	27
18. Micro plan, design principles	28
a. Landuse	28
b. Network systems	28
c. Pedestrians	28
d. Landmarks	28
e. Building vocabulary	28
f. Residential sector	28
g. Water management	28
h. Environment of Himalayas.	28
19. Micro plan, Design Abstractions	29
20. Conclusions, References	32

1.INTRODUCTION:

On the 8th of November 2000, Uttarakhand became a full-fledged state of India with the formal induction of a separate State Government. Uttarakhand comprises 13 districts that were carved out of the hilly terrains of Uttar Pradesh. They are Pithoragarh, Almora, Nainital, Bageshwar, Champawat, Uttarkashi, Udham Singh Nagar, Chamoli, Dehradun, Pauri Garhwal, Tehri Garhwal, Rudrapur and Haridwar (Urban). It occupies 17.3% of India's total land area with 51,125 sq. km. It has a population of about 6.0 million at 94.4 per sq. km. It borders Tibet, Nepal, Himachal Pradesh, and the Uttar Pradesh plains districts. Dehradun, the state's capital, is about 255 km away from India's capital, New Delhi.

The people are happy with this achievement but there exists too much uncertainty about the future. The larger political questions like Gairsain (Chandranagar state) as the permanent capital of the new province and the devolution of power to the people to ensure equity based participatory local self-governments still remain unsolved. Throughout the struggle for a separate state, among the various demands put forward, locating the capital in Gairsain was one of the most vigorously demanded. Several studies regarding the formation of the separate state had also looked into this matter. However, due to several logistics, when the state was formed, the capital chosen was Dehradun in spite of Gairsain being the overwhelming people's choice. As stated by the political leaders, the people's wishes will be respected and Dehradun shall remain the interim capital of Uttarakhand while the matter of Gairsain will be looked into. If it is found feasible and economically viable then Gairsain shall become the capital. Till then Dehradun shall be the capital while the more important task of making the state self-sufficient is fulfilled.



2.Aim:

To prepare a framework for decentralization of capital activities in Uttarakhand, taking into consideration its existing towns and their level of development.

3.Objectives:

- To study the existing conditions of the interim capital Dehradun and Nainital
- To Study the existing towns of Uttarakhand and the level of social and physical infrastructure of those towns.
- To draw a possible location for the capital functions and its decentralisation
- Propose a regional location for the capital for Uttarakhand.

4. Understanding the State Uttarakhand.

Spread over an area of 51,125 sq km., Uttarakhand is the 10th hill state of India. Located mostly in the Himalayas, the state has international boundaries with China (Tibet) in the north-east and Nepal in the south-east. On its north-west lies Himachal Pradesh while on the south is Uttar Pradesh. The topography of the region is mostly mountainous with a major portion under forests. Keeping in view the topographic characteristics, specific availability of land resources for urban development and economic mobility, all the thirteen districts in Uttarakhand can be divided into three broad categories, viz., the high mountain region (major portion of Uttarkashi, Champawat, Pithoragarh, Chamoli and Rudrapur districts); the mid-mountain region (major areas in Pauri Garhwal, Tehri, Almora, Bageshwar districts); and the Doon or Terai region (lower foothills, undulated plains of Dehradun, Nainital and Udham Singh Nagar and Haridwar districts). The state has many of the important peaks of the Great Himalayan region including Nanda Devi, Panchachuli, Trishul, Kedarnath, Chaukhamba, Badrinath, Bandarpunch and Kamet. Important glaciers like the Pindari, Milam, Gangotri and Khatling also originate here from which flows the Ganges, the Yamuna, Kali (Sharda), and Ramganga, among the major rivers flowing to the Indian plains. The forests are home to vegetation like pine, spruce, oak, rhododendron, deodar and medicinal and aromatic herbs.

a. Population, Demography:

According to the recently conducted census, it has population of 8, 479,562 on 1st March, 2001. With a population density of 159 persons per sq. km. it is one of the most sparsely populated states in the country.

The decadal growth rate of the population of the state has declined from 24.23% during 1981-91 to 19.20% during 1991-2001.

Literacy rate of population has shown a consistent upward trend in the state since independence and the 2001 census has revealed that among those aged 7 and above 72.3% were literate, 84.0% among males and 60.3% among females.

The state is characterized by a relatively high sex ratio of 964 females per 1000 males in the 2001 census recording a substantial increase in the rates from 936 in 1991. In 1999 according to the estimates by Registrar General of India, the state had a crude birth rate of 19.6, a death rate of 6.5 and infant mortality rate of 52 indicative of a demographically more advanced state in comparison with the other northern neighbours.

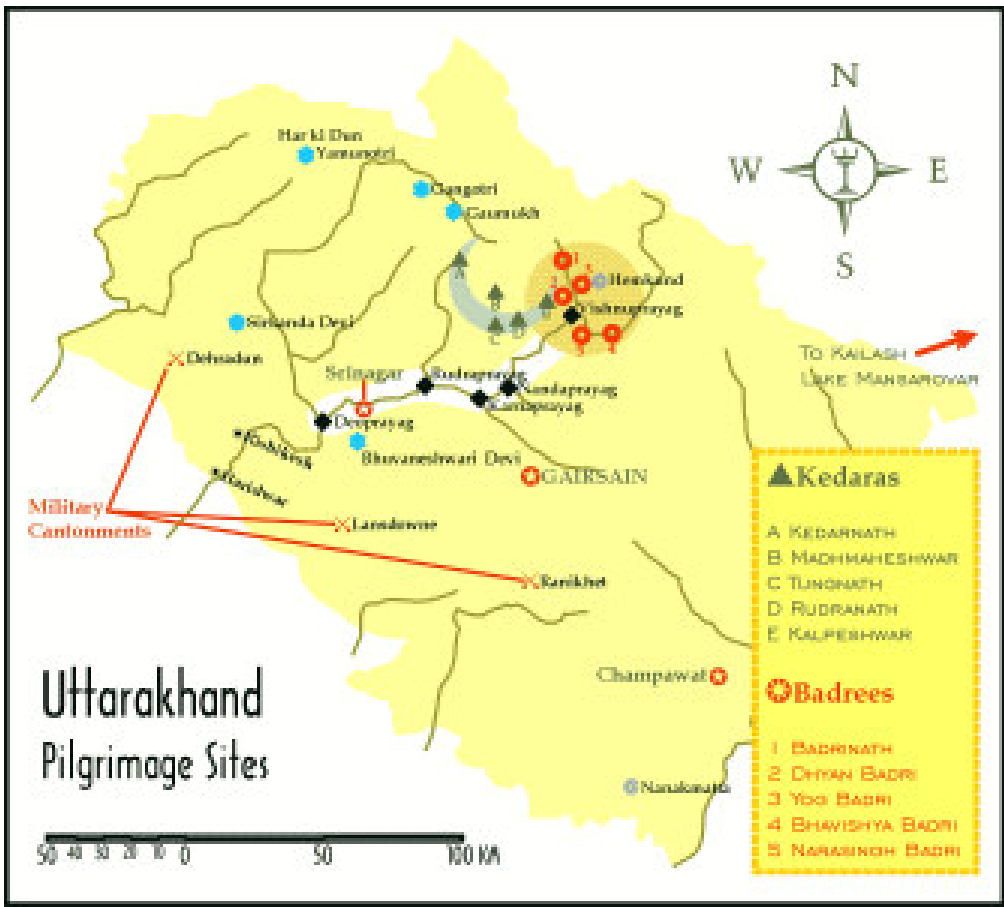
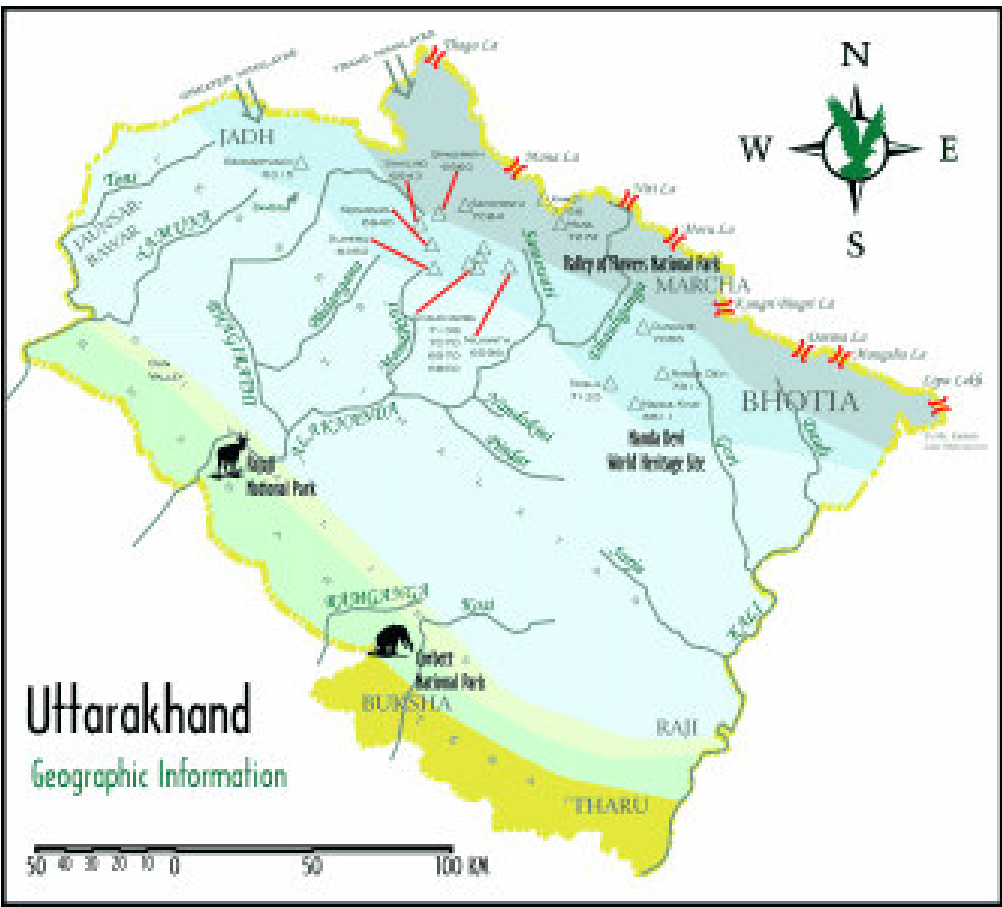
In demography and social conditions of literacy and status of women, the state is more comparable to the southern states of Tamil Nadu and Andhra Pradesh rather than its adjoining states of Haryana and Uttar Pradesh. However, in terms of economic conditions, levels of living and occupational patterns, the state is backward. There are large potentials for economic development especially in terms of hydroelectric power and tourism remaining untapped in the state.

Districts of Uttaranchal, 2001

District Area	(sq km)	Population	Headquarters
Pauri Garhwal	5,438	6,82,535	Pauri
Chamoli	9,126	4,54,871	Chamoli
Dehradun	3,088	10,25,679	Dehradun
Tehri Garhwal	4,421	5,80,153	New Tehri
Uttarkashi	8,016	2,39,709	Uttarkashi
Nainital	6,794	15,40,174	Nainital
Udhamsingh Nagar	3,358	9,14,861	Rudrapur
Almora	5,385	8,36,617	Almora
Pithoragarh	8,856	5,66,408	Pithoragarh
Haridwar	2,360	11,24,488	Haridwar
Bageshwar	1,626	2,24,172	Bageshwar
Rudraprayag	2,439	2,00,451	Rudraprayag
Champawat	1,642	1,97,000	Champawat

(Source: Census of India, 2001)

b. Physical settings of Uttaranchal:



c. Physiology

Garhwal and Kumaon, the two main cultural and political divisions of Uttaranchal, can be divided into three physiological zones that span the full breadth of the central Himalayas:

- 1 Northern Zone: Making up much of Uttarkashi, Chamoli, and Pithoragarh districts, this range begins at 3000 metres and proceeds steeply at places to as high as 7600 metres.
- 2 Mid Zone: Proceeding from southern Uttarkashi through Tehri, Chamoli, Almora, and Pithoragarh, here the slope rises to heights of 2000 to 3000 metres.
- 3 Southern Zone: Merging with the adjoining Terai, this area includes Dehradun, southern Garhwal (Pauri), and Nainital at around 600 to 2000 metres above sea level.

Apart from the Terai region in the Siwalik foothills, the entire state of Uttaranchal is a part of the Himalayan ranges. At 7,817 m above sea level, Nanda Devi in the district of Chamoli is the highest point in the state. The region has many glaciers, passes, meadows, and trekking routes with several major rivers like the Ganga and Yamuna originating from here. A major part of this Himalayan state comes under rainforests and alpine forests that are home to some of the highly endangered wildlife species.

Highest Peaks

Nanda Devi (7,816 m), Chaukhamba (7,138 m), Satopanth (7,075 m), Trisul (7,045 m), Kedarnath (6,940 m), Kamet (6,883 m), Neelkanth (6,596 m)

d. Climate:

The state has two distinct climatic regions: the predominant hilly terrain and the small plain region. The climatic condition of the plains is very similar to its counterpart in the Gangetic plain that is, tropical. Summers are unbearable with temperature going over the 40°C mark and a lot of humidity. Winters can be chilly with temperatures going below 5°C at times.

The Himalayan region has Alpine conditions characterized by cold winters with snowfall for quite a long time, good rainfall in the monsoon, and mild summers. This climate also provides the state with its only livelihood, i.e., tourism. The climate of the Western Himalayan region of Kumaon is alpine with chilly winters and mild summer. In the winters, temperature can dip below zero in the Greater Himalayas while it may go up to 32°C in the summers.

Most of the rainfall occurs during the period between June to September when 70 to 80 percent of the annual precipitation is accounted for. The effectiveness of the rains is, among others, related to low temperature which means less evapotranspiration from the forests and vegetation cover. This indicates that the soil moisture in the area is well preserved. Skies are heavily clouded during the monsoon months and for short spells when the region is affected by the passage of western disturbances. During the rest of the year the skies are generally clear to lightly clouded.

e. Soils:

Soils are the combined reflections of geological setting, relief, climate and natural vegetation. Soils of this region are quite varied in nature, depending mainly upon altitude and slope. In high altitudes, one of the dominating factors of soil characterization is glacial action. The nature and characteristics of soil at different locations are different. Leaving area under cultivation, the soil covers generally thin. The valley structures consist of both alluvial and diluvial materials. Cultivated areas with moderate slopes have a thicker soil cover consisting of relatively fine soil. These cultivated areas are generally on river terraces. It has been observed that the precipitous slopes are generally without soil cover. Whatever soil is found on these cliffs, exists in cracks, joints and along the foliation planes. Coarser soil is found to be scarce on the valley slope. Fine soil is found to be abundant on moderate slopes, while coarse soil is abundant on steep slopes. Thick layers of soils are distributed mainly in the valleys and the broad river tracts. Absolute rock exposures are the prominent features of crystalline basements, particularly in the high altitudes. Based on the chemical composition and fertility of the soils mainly, the hill areas can be divided into five soil regions.

1. Meadow soils: This type of soil is mainly confined near the water courses and cool shady places. Loam, varying from clayey to sandy, is quite common in this group. Owing to very high water table, these soils always remain moist and are therefore used for intensive cultivation. Upto an elevation of 1200m in the humid sub-tropical climatic vegetal zone, these soils are widely distributed, as in the West Ramganga-Gagas valley. These soils are neutral to moderately alkaline and calcareous and sometimes have well developed clay accumulation horizon in the sub-soils. Soils of this zone are very fertile and have widely been used for cultivation.

2. Red loams: These are sedentary soils derived from disintegration of parent rock and generally exist on steeper slopes. These soils receive maximum solar radiation and are always dry. The extent of cultivation in these soils is comparatively less. Such soils of warm temperate zone are developed generally on the lower hill slopes.

3. Podzol soils: Areas ranging between 1800 to 3000m in cool temperate to cold climatic vegetal zone have brown deciduous and grey coniferous forest soil. Forests of pine and other coniferous varieties develop acidic brown podzol soil; while oak forests produce deep brown podzol soils. These soils are widely spread in the higher parts of the region. These areas are not very frequently used for agricultural practices.

4. Brown forest soils: Associated mainly with the chir (pine) forest zone, these soils are of sandy loam to loamy types. Soils of the warm temperate zone are generally developed on the lower hill slopes (900-1800m) under the mixed pine and deciduous forests. In favourable aspects, the soils are quite deep. Soil acidity is enhanced under the pine forests. At several places, the soils have been converted into terraced fields.

5. Mountain meadow and glacial soils and snow covered areas: Soils of the alpine zone, extending between 3000 to 4000m, are mostly granitic sandy loam. Owing to steep slopes and cold climate, the soil formation in this zone is very low and the depth of the soil too is very less. In still higher areas, fluvio-glacial soils are found on terraces. In glacial areas, boulder clay and outwash soils are spread. In cold areas, near the snow line, soils are generally immature and vast rocky expanses are visible. On the lower slopes of the alpine zone, extensive grasslands (Bugyals) are spread over the mountain meadow soils. The remaining part of the area is useless for agriculture, and soils of other areas of this zone, being stony, thin-layered and less fertile, are also not of much use.

f. River Systems:

Uttaranchal Himalaya is one of the richest regions of the country as far as water resources are concerned. The river systems originating from the glaciers in the snow covered peaks of the Himalayas give rise to perennial rivers that water the vast Indian plains. The major river systems which originate here are given below.

1. Yamuna - Tons
2. Bhagirathi - Bhilangana
3. Alaknanda - Mandakini / Pindar / Nandakini / Saraswati / Dhauliganga
4. Ramganga
5. Kosi
6. MahaKali - Sarju / Gori / Dauli

The rivers Kali, Gaula, Kosi, Western Ramganga, Ganga, Yamuna and Tons drain this region. Excepting the Gaula, Kosi and Ramganga, which rise respectively on the southern slopes of Paharpani, Kausani and the northeastern slopes of the Dudhatoli ranges, all the others are fed by glaciers and originate far beyond the Great Himalayan Range. These are antecedent rivers and flows transverse to the structural axes in gorgeous channels, with irregularly terraced

patches of subrecent gravelly and sandy deposits along their paths, in the inner sedimentary belt of comparatively gentle gradient and milder topography. The main Indian tributaries of the Kali river, which originates at Kalapani near Lipulekh Pass, are Kuti, Darma, Gori, Ramganga- Saryu, Lohawati and Ladhiya, all flowing roughly in the southeastern direction. The Alaknanda, rising at Mana Pass, and the Bhagirathi, originating from Gamukh of the Gangotri glacier, join at

Deoprayag to become Ganga. The Ganga in turn is joined downstream at Byasghat by the Nayar rising from the Dudhatoli massif. The rivers Dhauli, Birahi, Nandakini, Pindar and Mandakini are the tributaries of the Alaknanda, while the rivers Jadh and Bhilganga are the only affluents of the Bhagirathi. The main tributaries of the Yamuna are Kamola and Aglar while the Tons is joined by the rivers Supin, Rupin and Prabar.



Alaknanda river at Srinagar



Alaknanda and Bhagirathi rivers at Devprayag

The small streams (gad) and ravines (gadhera) feeding the main rivers flow in a radial pattern in the Dudhatoli massif with the Ramganga flowing northeastwards, the Binau towards the southeast and the two Nayars draining southwestwards. Sixty percent of the discharge of these rivers is contributed by rains in the lower catchment area, preponderantly during the rainy seasons from middle June to middle September. The highest rainfall exceeding 200mm annually is received by frontal mountain rampart, the Nainital-Lansdowne-Mussoorie Range.

The state has the potential of generating over 15,000 MW of power. At present the state is producing 500 MW of power which usually comes down to 350 MW during winters. There are 17 hydro-electric projects already producing electricity. Also 32 mini- hydroelectric projects are producing 145 MW of power in the state. The Tehri Dam project likely to be commissioned in the next two years will generate around 2,000 MW of power. Major river projects in Uttaranchal are:

Khodri (Tons)
 Dhakrani (Yamuna)
 Dhalipur (Yamuna)
 Chhibro (Yamuna)
 Kulhal (Yamuna)
 Maneri Bhali-I (Bhagirathi)
 Chila (Ganga)
 Kalagarh (Ramganga)
 Khatima (Sharda).

Besides there are a number of microhydel generation projects in operation with 9730 kw electricity. The most ambitious power projects under construction are Vishnuprayag, Srinagar and Tehri schemes. The other proposed big power projects are Karanprayag, Kothibhal and Utyasu. These major hydropower projects, on completion, will generate 3500 MW for the state.

g. National Parks/ Sanctuaries:

The mountains, meadows, lakes and dense forests in Uttaranchal support exotic wildlife and plant life. These wonderful creations of nature add a dash of splendour to nature's abundance that exists in the environs of the Garhwal and Kumaon regions. In order to preserve this gift of wildlife and enable visitors to have a privileged view of the same, the State has created special areas, national parks and sanctuaries. As a follow-up measure, the Uttaranchal Government would soon enact a law banning use of polythene bags to save the hill State from getting polluted by this non-biodegradable menace. The following are the national parks/ sanctuaries in the State of Uttaranchal.

1. Corbett National Park
2. Rajaji National Park
3. Nanda Devi National Park
4. Valley of Flowers
5. Kedarnath Sanctuary
6. Askot Sanctuary

Uttaranchal's forests are heavily exploited by outside commercial interests. What little is left to the locals is stressed beyond the breaking point. This is one of the main factors that prompted the Chipko movement where the people struggled for their forest rights.

h. Geology:

The Himalayas constitute one of the youngest mountain systems in the world and the youngest in India and date back only about 40 million years. The Himalayas are the repository of active geological phenomena and is also the locale of substantial earthquake occurrence. The Himalaya is divided longitudinally into six tectonic zones. From south to north these zones are: the Outer or Sub Himalaya, the Lower or Lesser Himalaya, the Higher or Greater Himalaya, the Tethys or Tibetan Himalaya, the Indus Suture Zone and the Trans Himalaya. The north verging thrust zones demarcates this division, into several concentric litho-tectonic domains. All of these thrusts are also characterized topographic breaks. Viewing from south the plains of Ganga Foredeep are separated from the Outer (Siwalik) Himalayas by the Himalayas Frontal Thrust (HFT). It has an average elevation of 600 metres. The northern boundary of this domain is defined by the Main Boundary Thrust (MBT) which heads northwards at 30 to 40 degrees. The Lesser Himalaya domain which follows on the north has an average elevation of 2500m with a slight gradient towards the north. The Lesser Himalaya Zone has its largest exposed width of about 80 km in the Kumaon and Garhwal regions. This domain is composed of ancient metasedimentaries of the Precambrian to Paleozoic age. The rocks are overlain and covered by crystalline thrust sheets in the form of large klippen masses, occupying mostly the higher topographical levels of the Lesser Himalayan ranges. The crystalline thrust sheets have their root zones in the Higher Himalaya Zone and their present location so far south in the Lesser Himalaya Zone can be explained by the southward movement of the nappes. The rocks are considerably folded and fractured.

The Main Central Thrust heading northwards at 40 to 50 degrees separates the Lesser Himalaya Zone from the Great Himalaya domain in the north. The latter domain is composed of high-grade (garnet) metamorphic rocks. The average elevation is 4500m. The rocks are highly folded. The MCT is the root zone for the thrust sheets of the Lesser Himalayas. Overthrusting of the order of 80-100 km is estimated along the MCT. In the Kumaon region the MCT is well defined between the Higher Himalayan Crystallines and the Lesser Himalayan rocks.

The MCT is characterized by mylonitization and considerable ductile movements on this thrust planes took place while it was buried at 10-15 km and was at the base of the upper crust. The MBT and the HFT are brittle. The MBT is locally known as the Krol Thrust in the Garhwal and Kumaon Himalayas. The width of the various domains noted above vary considerably along the Himalayas which means that the various thrust zones meander in a north-south direction.



Agricultural fields along the river stream

i. Land form:

The Uttarakhand Himalayas stretch from the Kali River, which defined the Indo-Nepal border in the east, to the Tons-Pabar valleys demarcating the eastern border of Himachal Pradesh. It comprises the districts of Pithoragarh, Almora, Nainital, Bageshwar, Champawat, Pauri, Chamoli, Rudrapur, Uttarkashi, Tehri and Dehradun. The former five districts fall in Kumaon while the latter six lie in Garhwal. The remaining two districts, Haridwar and Udham Singh Nagar, lie in the plains.

The Uttarakhand Himalayas fall into five well defined physiographic belts, each being a distinct geological unit: the Bhabhar, the Siwalik, the Lesser Himalayas, the Greater Himalayas and the Tethys or the Tibetan Himalayas. The submontane Bhabhar is a piedmont belt in the foothills.

j. Earthquake History:

This region has been among the most seismically active in the Indian Sub-continent. Earthquakes regularly shake this region and since records have been kept there have been dozens of magnitude 6+ events. Since instrumental recording of earthquakes began in India from the beginning of the 20th century, more than 650 earthquakes of magnitude 5 or more have been recorded in the country up to 1988. No great earthquake, however, has occurred in the Indian region since 1950. In view of the Himalayan region being under heavy stress, recurrence of such earthquakes is to be expected.

The Himalayas are attributed to the collision of the Indian and Eurasian plates. It has been postulated that the portion of this convergence has been by thrusting along the Himalayan Frontal Zone. Later, the suture became inactive and since then the movement of convergence was mostly taken up by the MCT. While the causes of generation of the two thrusts are still debated, there is still evidence to suggest transmission of stresses from north to south extending up to the Main Frontal Thrust.

5. Urbanization:

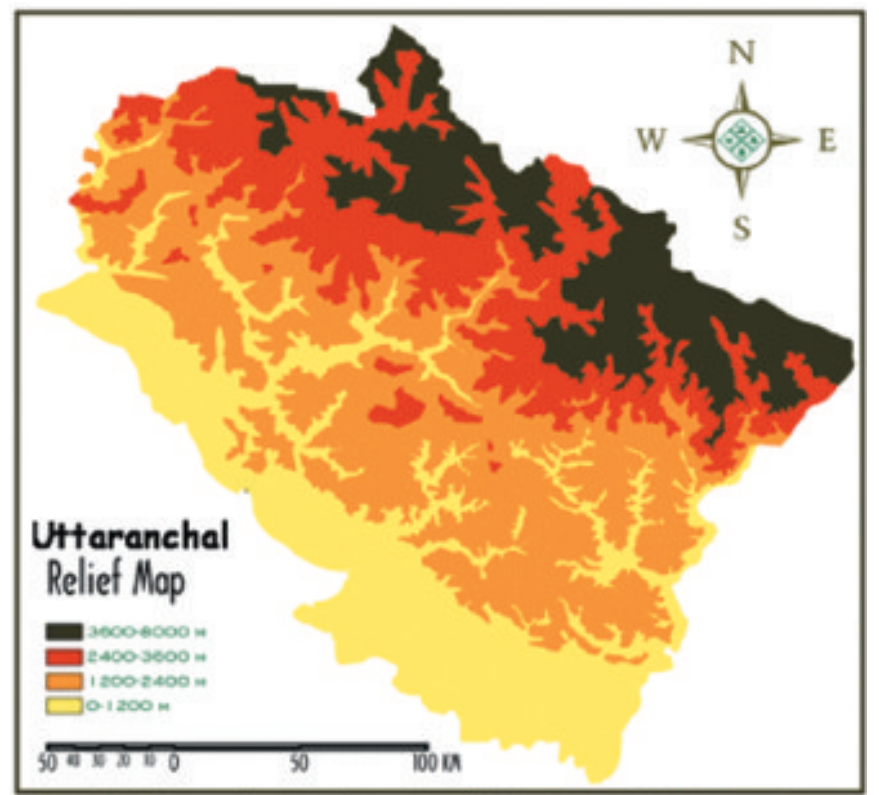
As a cultural artefact, the hill towns make a bold appearance on the undulating physical landscape of mountainous regions. The functional monotony, the less frequency of alternate routes, the limited and more traditional means of trade and the pilgrim base of the evolution has resulted in the peculiar space relations and interaction in the hill areas.

a. Common Characteristics of Hill Stations:

- 1) Most dispersed over difficult terrain, are small and isolated.
- 2) Majority of them are inaccessible due to poor transport and communication facilities.
- 3) People live at the subsistence level and have to travel long distances to collect water.
- 4) Certain specific tourist/pilgrim towns have grown rapidly. Some have the added advantage of being administrative centres, educational centres, cantonments or supporting significant industrial activity.
- 5) Towns and cities, in their distribution, show linear pattern along river valleys or important roads linking the plain with centres of tourism or religious importance.
- 6) Isolated higher order settlements exist generally in the foothills. These are collection points (or trade centres) for agricultural and forest produce. These are few of the towns which can give impetus to growth in the surrounding areas.
- 7) Settlements show potential for forest, livestock and horticulture-based economic activity.



New Tehri- top of the hill range



(Source: <http://www.garhwali.com/uttarakhand/relief>)

Himalayan ranges according to altitudes



On the way to the Thalysain, Isolated remote village



Towards Gairsain- foot hills settlement next to water channel



Nainital - Tourists paradise

b. Urbanization in Uttarakhand:

According to the 1991 Census 23.18% of the population lived in urban areas in Uttarakhand with some of the least urbanized regions in the country. In 2001, the figure increased to 25.59%. In Uttarakhand the towns had three types of development. One was the religious towns or pilgrim spots. Then there were the administrative capitals of historical times. Finally during the British period, to take advantage of the climate, they developed the hill resorts which gave birth to the urban habitation in these hills. These also acted as trading centres and a significant junction for break in transport while moving up to the hills.

The settlements from south to north (from foothills to higher altitudes) may be described as following:

1) The cities situated in the Terai region are unhealthy, ill drained and backward.
2) Habitations on the foothills of the Himalayas are Haridwar, Haldwani, Kathgodam, etc. which are small religious, commercial and trading centres.

3) Cities situated in the 'Duns' i.e., Dehradun is the most developed city in the state. It records a fast growth rate and is a multi-functional city.

4) Hill resorts, which are situated on reasonable heights, are easily accessible through well built roads and are appreciably developed in modern facilities. Low temperature provides cool and soothing climate to the residents and tourists even in the scorching summers.

Such hill resorts are Mussoorie, Nainital, Ranikhet, Ramgarh, Almora and Lansdowne. Nainital was developed as the summer capital by the British administrators. Ranikhet developed as a big military centre and Mussoorie as a holiday resort for the officers and the rich.

5) Then there are the remote and high pilgrim sites of Gangotri, Kedarnath, Badrinath, etc, which are some of the most important religious sites of the Hindus. Every year thousands of pilgrims visit these areas and for a few months in the summer when they are accessible, these settlements expand hugely to accommodate all the people. These have, however, not developed into city centres in the strict sense of the term. Besides, for about six months in the winter, they remain covered with snow and are actually uninhabited.

The urbanization pattern of Garhwal and Kumaon again are traditionally different. Kumaon, and Dehradun in the plains, are all legacies of the British rule. These towns were developed primarily for two reasons: as hill resorts to escape the Indian summers or as military towns and Cantonments. The expansion of railways and establishments of educational institutions further helped the growth of these towns. As a result, these towns till today bear the signs of British planning and architecture in the form of buildings, use of public spaces, gardens, estates and roads. In contrast, the urban centres of Garhwal are a more modern phenomenon and part of the urban process that took place in India after independence. Thus the hill regions which had only 4.0% of urban population in 1961 had an urban population of 23.18% in 1991. This was due to the addition of various new towns like Srinagar, Rudrapur and so on.

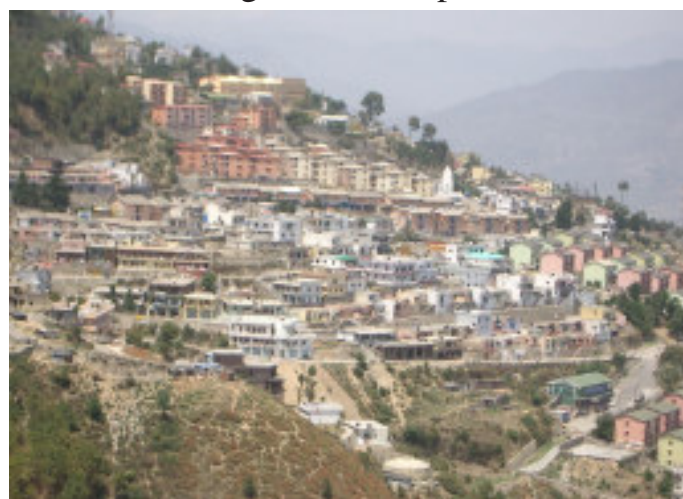
Uttarakhand is one of the least urbanized states in India. The urban population to the total population was only 18.2% in 1981 and increased to 23.17% in 1991. This low degree of urbanization is attributed to the predominantly subsistent peasant economy, meager industrial development and the lack of transportation facilities resulting in the low degree of interaction among the various places.



Dehradun



Nainital



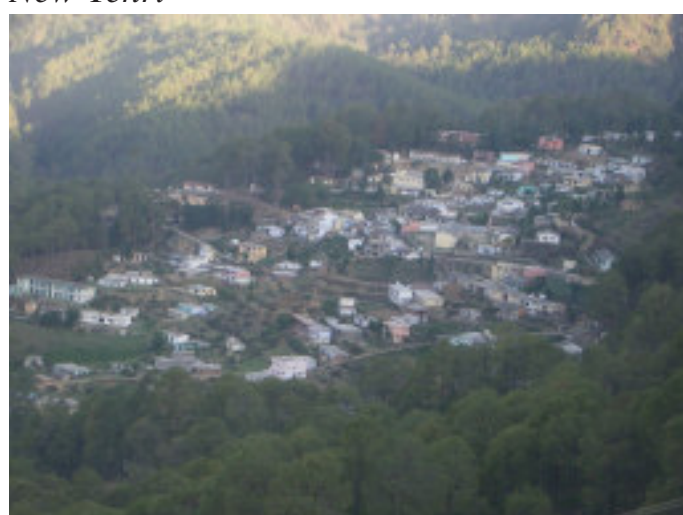
New Tehri



Adibadri



Narendra Nagar



Thalising



Karnaprayag



Srinagar



Village near Pauri

6. Infrastructure:

The development of infrastructure has generally been identified as an important factor in the process of development. It has been considered a cause, a consequence as well as an indicator of development. However, while the development of infrastructural facilities e.g. transport, power, irrigation and human and social services etc. are undoubtedly necessary for promoting development and growth, it is also necessary to bear in mind that their impact and role need not necessarily be similar in different situations. Resource endowment, level of development and structure of the economy are some factors that mediate and influence their economic role and impact. Thus, in analyzing the role and impact of infrastructure of any particular area, one has to take these factors into account as well. (Joshi, 1986)

a. Constraints on Development:

The main handicaps of hill regions are physical inaccessibility, lack of electricity and smaller number of towns to act as growth foci. Consequently transport costs are high. The cost of provision of economic and social services also tends to be higher in hill areas. The strategy of development must first of all aim at mitigating the impact of the unfavourable geographical features pointed above. Only then it would be possible to fully exploit the vast development potential of hill regions. The comparative advantage of the region lies in developing primary sector based activities and services sector, particularly tourism. Although the possibilities of developing large-scale industries in the region are limited, there is considerable scope for developing agro- and forestry-based small scale industries. Huge investment is also required for the full exploitation of water resources of the hill regions for meeting the needs of power and irrigation not only of this region but also of other parts of the country as well. Along with this it is necessary to improve accessibility by improving the transportation facilities.

In the districts there are 257 primary health centres 23 community health centres and 32 large hospitals including male and female hospitals, combined hospitals and 3 base hospitals. Drinking water is a specific requirement of Uttaraanchal. The problems of drinking water supply here are completely different from those in the plains.

b. Transport:

Jolly Grant near Dehradun is the only airport. There are regular flights to Delhi by Indian Airlines. Otherwise, one has the option to travel to Delhi by road or rail and then take the air route to various destinations. A smaller airfield which serves Kumaon is the one in Pantnagar, about 70km from Nainital. Dehradun, Haridwar, and Kathgodam are the major railway stations connected to almost all parts of the country with regular trains. Not many places in the state are connected by rail because of tough terrains. For those visiting places in the higher altitudes, trekking and road routes are the only options available.

All-weather metalled roads connect almost all the important places in the state. Many places in the higher altitudes may still remain off for a period in the year due to landslides and snowfall. National Highways such as 58, 73, 74, and 87 connect places in the state to other parts of the country. Regular bus services connect Delhi and other major centres in North India with Dehradun.



Air space



Primary Hospital



Dams-Hydro Power



Foot bridges



To Primary School



Water management for fields



Roads and Bridges



Sports over Terrace



Roads and Landslides

7. Todays context in Uttaranchal:

since the formation of the State, the development remains majorly in the plain areas whcih are doon valley and terai region. Due to the advantage of Connectivity, Facilities, and importatly the capital location. Moreover, the major issues like Poverty, migration from mountains region to plains are for emplyoment and other economic opportunites. this situation is leading to a fracture between the two regions which is a big set back for the development of the state.

Hence the need is to look into the identity of the state, by which the functions are to be relocated in a way to dissimate the powers and functions to the people at the grass root level. With this major issue, the Present interim Capital has to relocate in such a way that the politics will be close to the mountain people and development process will stop the migration and poverty in the state.

8. Dehradun - Interim Capital:

Dehradun, the only major town of Uttaranchal, was declared the interim capital of the state on its formation. In a state dotted with small towns, Dehradun is the only town with adequate infrastructure, amenities and linkages to serve the function of a capital city. However, the common consensus of the people is to locate their capital city elsewhere. Several contenders, including Nainital, Gairsain, Kathgodam, Dehradun, etc. are in the picture with Gairsain being the overwhelming choice. It is for this reason that Dehradun has been declared as the ‘interim’ capital and the final location of the state still remains an open question with the present government stating that unless the state is better off economically, the matter of the capital shall remain shelved. This is a practical necessity rather than being just a political move considering that the state is faced with more pressing matters than the final location of the capital.

a. Evolution and Growth:

Nestled in the mountain ranges of the Himalaya, Dehradun is one of the oldest cities of India. Also known as the ‘Adobe of Drona’, Dehradun has always been an important center for Garhwal rulers, which was captured by the British. The headquarters of many National Institutes and Organizations like ONGC, Survey Of India, Forest Research Institute; Indian Institute of Petroleum etc are located in the city. Some of the premier educational and Training Institutes like Indian Military Academy, RIMC(Rashtriya Indian Military College), Indira Gandhi National Forest Academy(IGNFA), Lal Bahadur Shahstri National Academy of Administration(LBSNAA)etc are also there in Dehradun. It is a favored tourist destination as it attracts tourists, pilgrims and enthusiasts from various walks of life to its serene environs. Add to this the abundance of special Basmati rice, tea and leechi gardens, which contribute in turning the city into a paradise.

The city of Dehradun had a population of 3.76 lakh in 1991 which has grown to more than 7 lakh by 2001. During 2000-2001, the population grew at a rate of 10% as per the Mussoorie Dehradun Development Authority (MDDA). However, with mounting population, the natural environment of Dehradun is showing signs of decay. Lime kilns, vehicular pollution, dust from unpaved roads and large scale captive power generation are the main reasons for air pollution in the city.

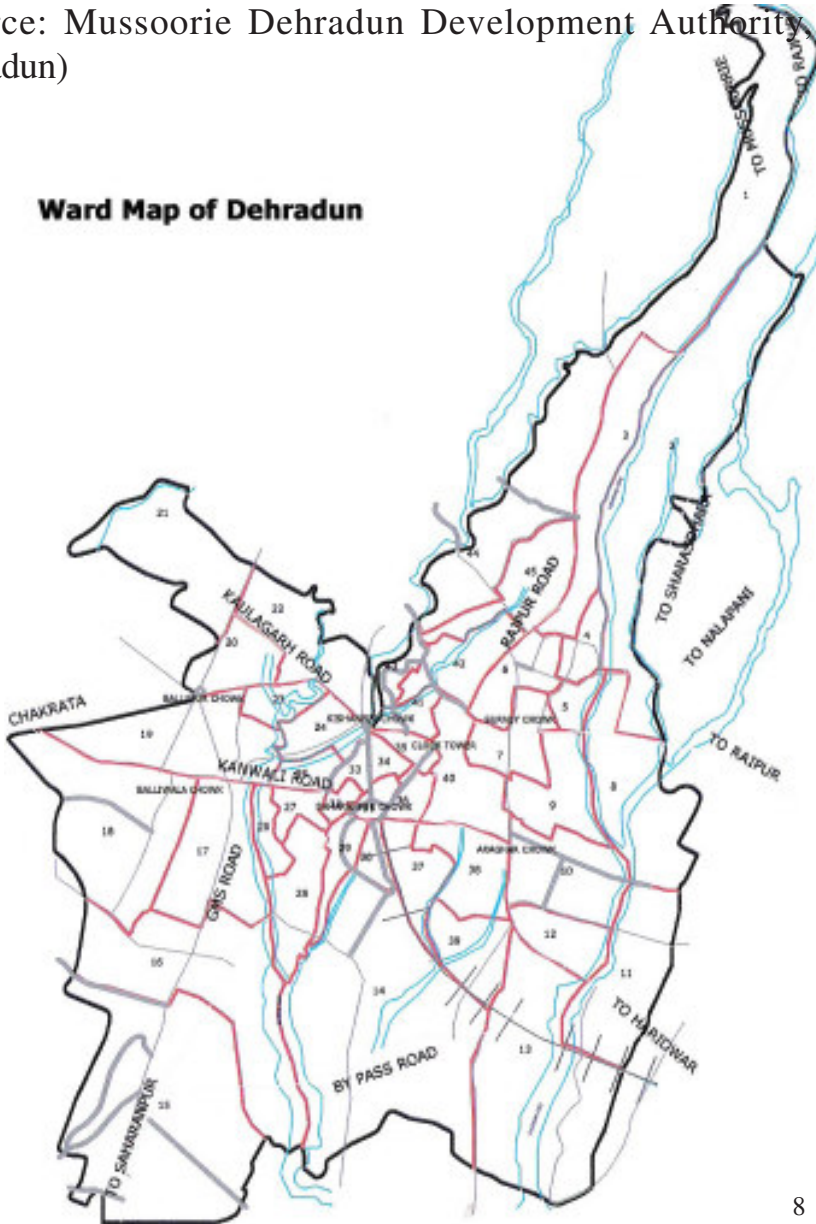
The population of the city has risen alarmingly and it has put severe pressure on the natural resources of the region. The city was never planned to support the mammoth population it has today and the entire infrastructure is on the verge of collapse. Compounding this factor, Dehradun has become the interim capital. All the concentration of activities is taking place at an alarming rate and the possibility of the capital shifting is very essential for the city’s existence for future genration.

- The district is situated in the north-west corner of the state.
- It is bounded on the north and to some distance in the north-west by the district of Uttarkashi,
- In the east by the district Tehri Garhwal and Pauri-Garhwal
- In the south by the district of Saharanpur(Uttar Pradesh) ,
- At its southern tip touching the boundary of district Haridwar.
- Its western boundary adjoins the Sirmur(Nahan) district of Himachal Pradesh with the rivers Tons and Yamuna separating the two.
- Lies between 29 degrees 58' and 31 degrees 2' 30" north latitudes and 77 degrees 34' 45" and 78 degrees 18' 30" east longitudes.
- Total area of the district is 3088 sq kms.
- Altitude is 640 mts.(2100 ft) above sea level .
- Population (2003): 447,808 persons
- Area: 64 Sq. Kms
- Wards: 45
- Slums: 100+
- City Expansion: SE-SW

b. Landuse of Dehradun City, 2001

Landuse	Area (sq. km)	Area (%)
Built-up area	54.722	18.47
Vegetated area	199.793	67.43
Water bodies	0.125	0.04
Vacant area	10.869	3.67
Others	20.258	6.84
Total	296.47	100.00

(Source: Mussoorie Dehradun Development Authority Dehradun)

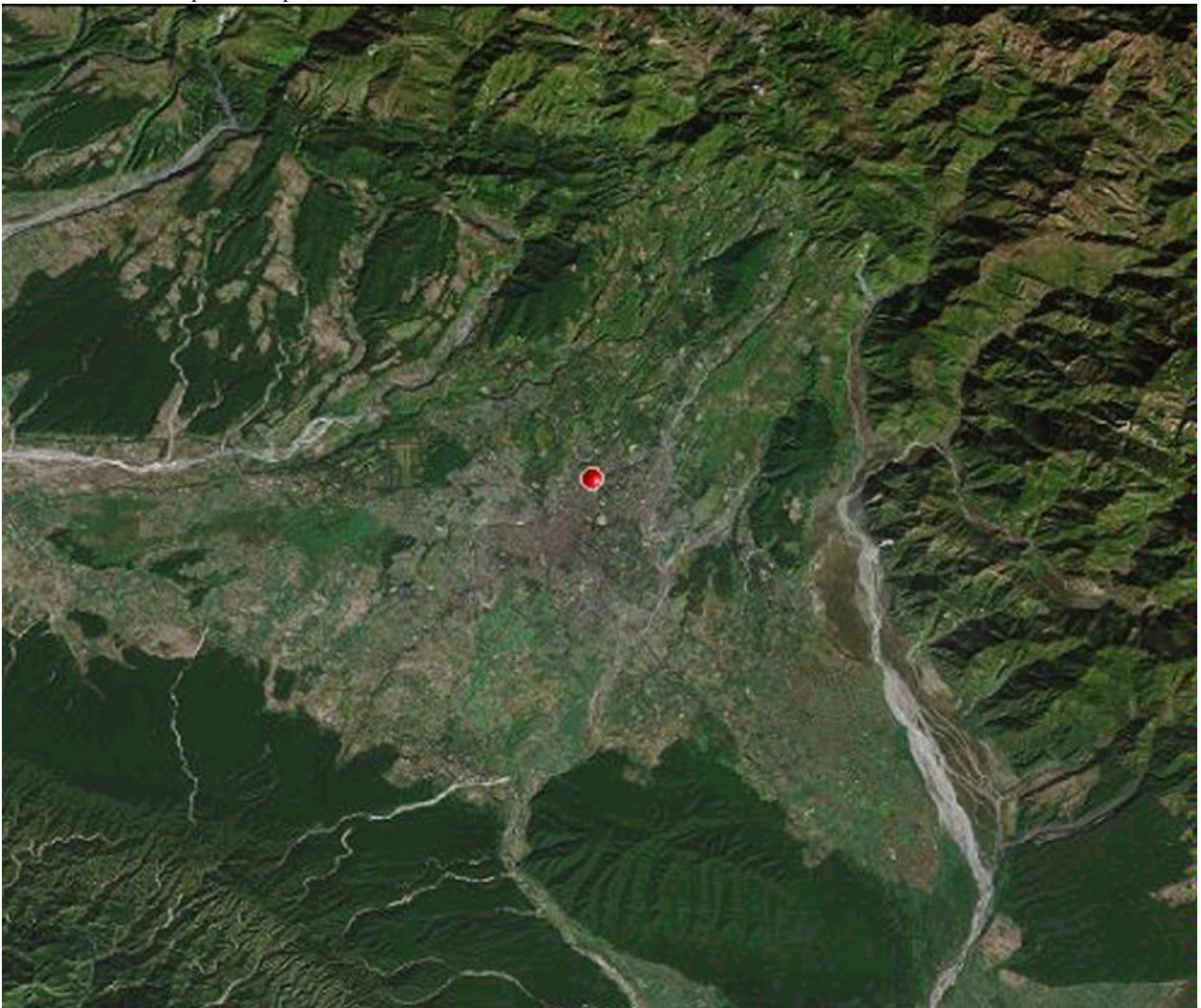


c. The Existing Scenario, Impact of Urbanization:

The physical expansion of Dehradun has been dictated by its physiography i.e. existence of a number of seasonal streams, hills in the north, east and north-west and the undulating landform. This has not only influenced the direction of the growth but also contained the shape of the city.

The main town is sandwiched between Bindal River and Rispana Rao. The ancient Gurdwara and the Clock Tower are important landmarks of the town. With increase in the population and changes in the functions of the city, Dehradun is facing the problems of ribbon development along Rajpur Road and Sahastradhara Road. The city has been expanding towards Haridwar Road, Shaharanpur Road and Chakrata Road where the landform is relatively flat and accessibility is easier. As the proposals of the Master Plan, 1982 were not implemented, the city is facing the following problems.

1. Land under cultivation and orchards is declining.
2. Uncontrolled quarrying operations and deforestation around the city have resulted in environmental degradation.
3. The majority of residential areas have not been developed as planned colonies but have come up in an ad hoc and unorganized manner without any consideration for the building by-laws, road widths, infrastructure provision, etc.
4. The main development is consisting of a large number of residential schools and unplanned residential growth.
5. A number of landuse violations have taken place. This has put pressure on land and led to steep rise in land values.
6. The Master Plan had earmarked an area of 226ha for parks and open spaces. However, this area has not been fully developed. On the other hand gardens and orchards are being encroached, creating ecological imbalance.
7. The town has inadequate water supply in terms of present demand. The city is dependent mainly on non-perennial river water sources and underground sources for requirement. Jal Sasthan has tried to augment the requirement of water supply by commissioning tubewells. However, in the absence of an integrated water supply and distribution system commensurate with the growth of the city, the supply network needs to be augmented besides extending it to new residential colonies and the fringe areas, to avoid the shortage of water to these colonies.
8. The main part of the city has underground sewerage. New colonies are dependent on individual septic tanks and surface drains. The topography of Dehradun is such that water flows on account of gravity from north to south. Drainage is carried through pucca and open nallahs into seasonal runoffs.
9. Traffic and transportation problem is assumed in alarming proportions. Public transport is inadequate to meet the total passenger trip demand. Intermediate modes of transport cause not only congestion along roads because of unauthorized parking but are a serious source of pollution. Future proposals are required to address a comprehensive traffic and transportation policy taking into account public transport, intermediate modes of transport, organised parking, taxi services, etc.
10. Adhocism, in terms of selection of sites for different functions and their locations has added to the already deteriorating traffic and transportation problems.





Traffic problem and inadequate Road widths



Urban scape-chaos by the commercial sector



landmarks- no identity



Where does pedestrain go?



Lack of playgrounds and infrastructure



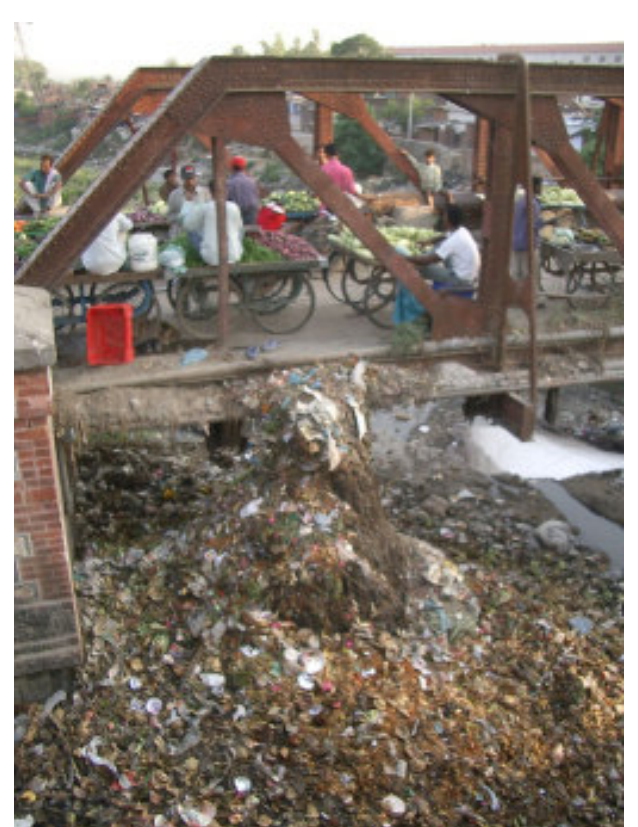
inadequate public Transportation system



Identity- Heritage



Enchroachents- Slums

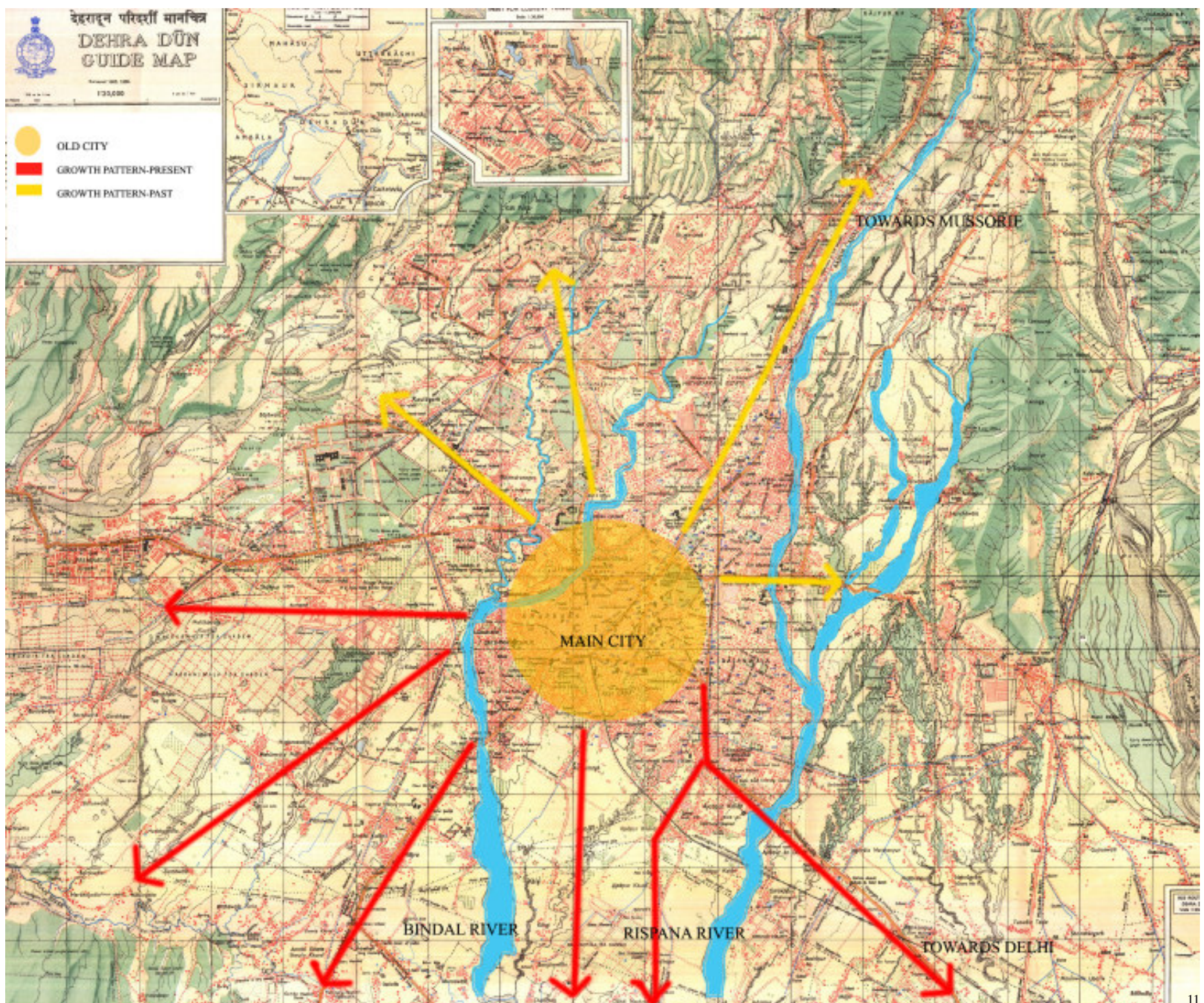


Solid Waste- Polluting Environment

Dehradun main city and growth pattern



Dehradun Region map- showing the Growth pattern



9.Nainital:

Nainital is situated at an altitude of 1938 metres on the southern extremity of the Lesser Himalayan Zone in Kumaon. Nainital is one of the most popular tourist resorts of India. It covers an area of 14.32 sq. km. and lies on the outermost ranges of the Kumaon Himalaya that are lower in altitude than the rest and have the outermost location facing the plains to the south. It is situated in 29.24' north latitude and 79.28' east longitude and is in the proximity to the Main Boundary Thrust, a structural feature separating the Lesser Himalaya and the Siwalik ranges. The town is 34 km from Kathgodam, the nearest railway head, and 331 km from Delhi by bus via Haldwani, or 300 km via Kaladhungi.

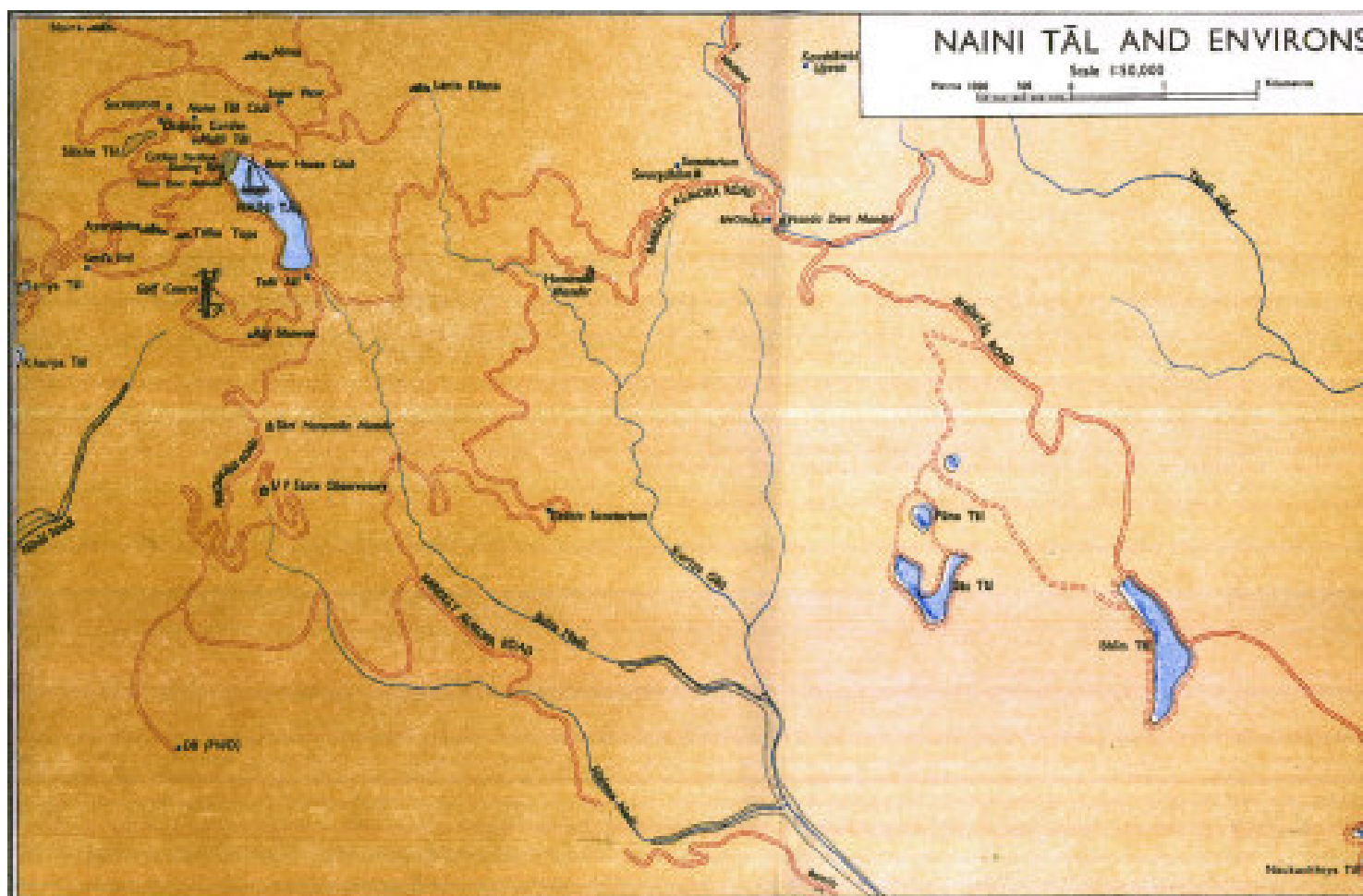
Nainital is the district headquarters of the district of Nainital and the settlement has evolved around the Nainilake, one of the biggest in the Kumaon. It extends over an area of 14.32 sq km and has a total population of 39,840 persons according to the 2001 Census. Nainital is located in a cup-shaped valley, the principal settlement concentrating on slopes around the lake in all directions except SE. The valley occupied by the lake is aligned NW-SE and the altitude culminate towards SE, the direction in which the drainage of the valley opens. The maximum area of the town falls in the altitude zone of 1900-2100m and the western slope account for a major proportion in this. The lake is the principal attraction around which the entire morphology of the town has evolved.

a. Evolution and growth:

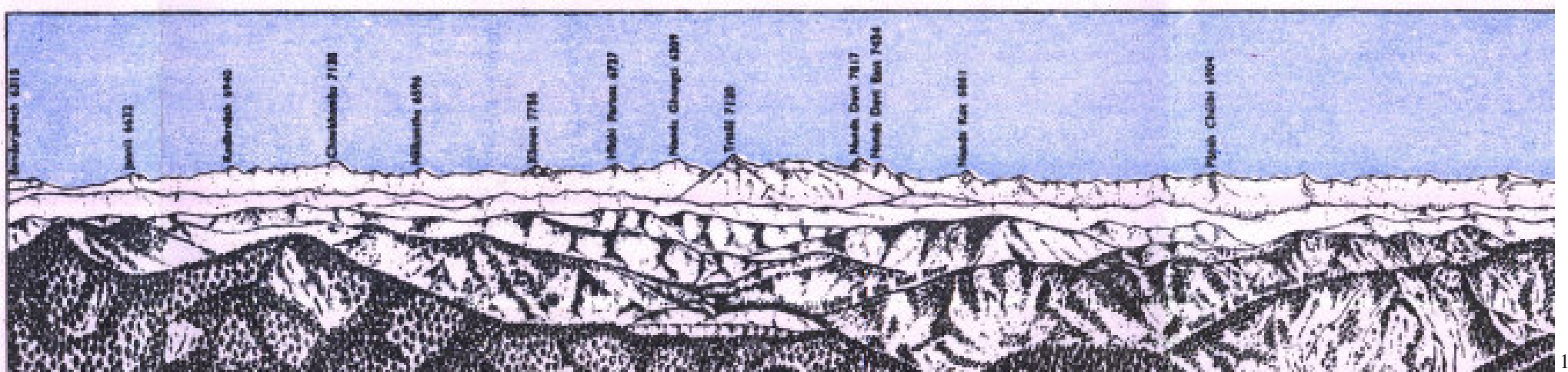
The town is comparatively of a recent origin and the discovery of the place dates back to 1839 by an Englishman. The British administrators took immediate measures to settle the place and The Existing Towns of Uttaranchal by the end of 1882 a few houses had already come into existence. The place came into eminence within a span of hardly a decade. The growth of the settlement was very quick, so much so that in October, 1850, the town was given the status of a municipal board.

During the second half of the 19th century, Nainital witnessed a phenomenal rise in many urban functions and a number of services and facilities emerged to serve the growing needs of the town. In 1860, Nainital was made the summer seat of the U.P. Government, and then known as the North Western Provinces, and this was followed by a remarkable expansion of the town with growth of schools, markets, parks, stadium, clubs, theatres, Secretariat and other administrative offices, etc. Gradually the town expanded and the Census of 1901 recorded a population of 7609 persons. By now, the town, apart from serving as the summer capital of the state, had also become a popular health and summer resort and a renowned centre for education too. The rail link to Kathgodam in 1884 and the completion of a motorable road between Kathgodam and Nainital in 1919 were significant factors that helped the early growth of the town. The population of the town, however, did not record any significant changes between 1911 and 1951.

After independence, Nainital continued to serve as the summer capital of Uttar Pradesh, although then the Secretariat shifted hardly for one or two months during the summers. In 1960, the U.P. Government decided not to shift the capital to Nainital due to a number of factors and although initially this step proved a great setback for the economy of the town, it soon revived its lost significance and emerged as a tourist resort. By 1970, the town emerged as a full-fledged tourist centre with the development of recreational as well as facilities of service infrastructure.



THE SNOWS FROM NAINA PEAK



b. Tourism

The economy of the town is mainly dependent on the tourists who visit Nainital the year round. Nainital enjoys the distinction of having the tourists all the year round rather than just in a particular season. The main reason for its popularity, apart from the natural beauty of the town itself, is that it is located close to Kathgodam (which has a railway connection), Pantnagar (which has an airport) and the surrounding eight lakes, all of which has a huge tourist attraction. Apart from its excellent linkages, the town has better infrastructure and amenities than the surrounding towns. Since the other sites are also located at close proximity, most tourists use Nainital as a base from which to explore the other attractions. However, the pressure of tourists every year in the absence of an adequate management plan has taken its toll on the town and Nainital is facing environmental problems which can turn quite serious if not checked. A most common manifestation of this is the occurrence of landslides which are quite common in both the town and its surrounding areas.



c. Landuse:

Landuse of Nainital, 2001

Landuse	Area (in Ha)	% to Total Landuse
Residential	90.54	7.74
Rural	15.50	1.32
Commercial	17.75	1.51
Administrative	34.00	2.90
Community Services	109.66	9.35
Services	0.74	0.06
Transport	14.07	1.20
Forests	508.76	43.31
Lakes, streams, rivulets	68.90	5.76
Open undeveloped areas	313.08	26.82
Total	1173.00	100

(Source: Municipal Office, Nainital)



d. Existing Scenario: As can be seen from the table above, it is forests which occupy the maximum area. However, the town has further scope of development in the open undeveloped areas. But the transition must be done judiciously. The open lands, to be used indiscriminately for the purpose of development, would result in a mishap. A great percentage of the area also falls under community services. This category includes educational, health, parks, wildlife parks, religion, communication, police and fire station and cremation ground uses.

Nainital is known not just for its established residential schools but also institutions of higher learning. The Kumaon University is located here and is the only one of the Kumaon region. There are colleges and specialised institutes too. Being a tourist town, the presence of community spaces are not just a The Existing Towns of Uttarakhand practical but also an economical necessity. The high percentage of water bodies is due to the presence of the Naini Lake which dominates the town and is located at the centre around which the town, especially the hotels that cater to the tourists are located. However, it is the area under transport that is most noticeable inadequate. With the rise in vehicle ownership, a large proportion of the tourists nowadays travel in their own vehicles and the lack of parking spaces causes problems both for the locals and for the tourists themselves.

The Nainital Development Project (1995-2011) envisages a change in the land use by addressing this issue of transport and also by using some of the open land for developmental purposes. However, only a portion of the open land will be used and the rest of it will be restricted from further use to protect the town against overbuilding.



Enchroaching Hill slopes



High court, lost Heritage



Mall Road-Colonial planning principle



Dense Urban fabric



Transforming Valley



Narrow Streets- Commercial streets



Naina Lake- Tourists Paradise



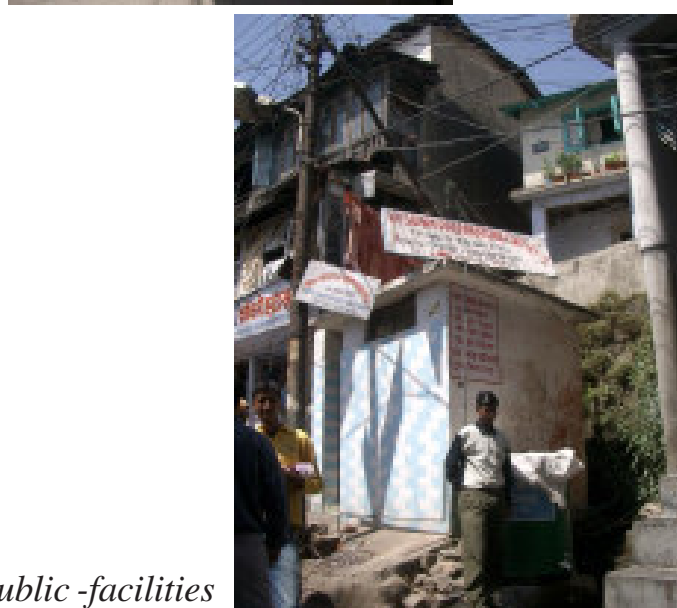
Street scape



Parking problems-impact of mixed functions



Set back-Heritage



Public -facilities



Inadequate Road Widths

10. Architecture and Urbanization Scenarios inUttaranchal:



Colonial

Ornated frames



Vernacular- Pauri



Art Deco Dehradun



srinagar



Adibadri-temple complex



Himalayas-Landform



Palace Narenara Nagar



Landslides



Vernacular- Stone walls & Slate roofing



Debris-environmental damage



Village at Foot hills



Water management



Isolated but Connected 16



New Tehri- Concrete Jungle



Public Space- KarnaPrayag



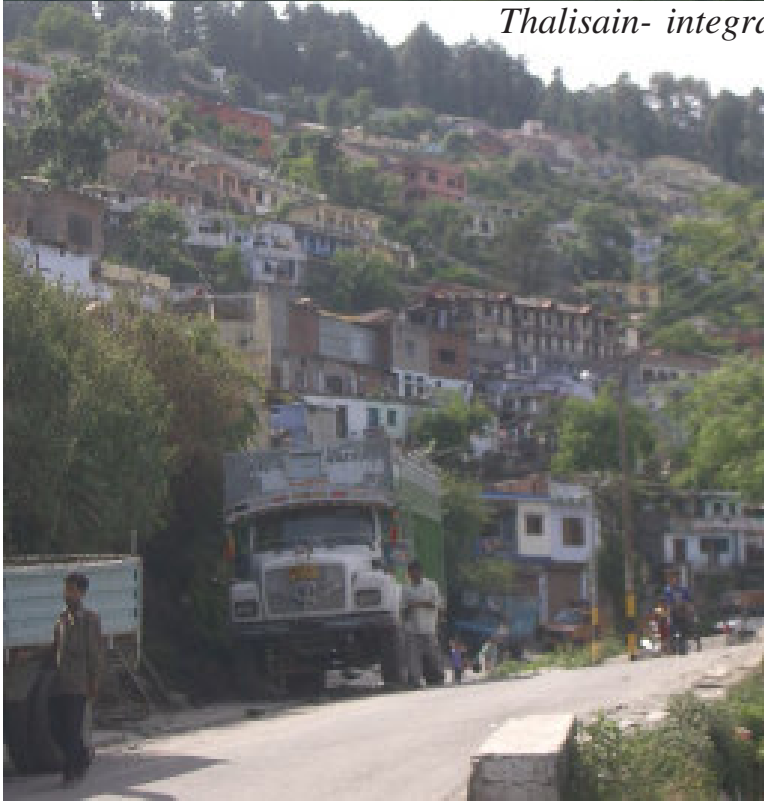
New Tehri- Concrete Jungle



Public Space- Pokhal



Thalissain- integrated with Nature



Pauri



Streetscape- New Tehri



Enchroachments over Rivers



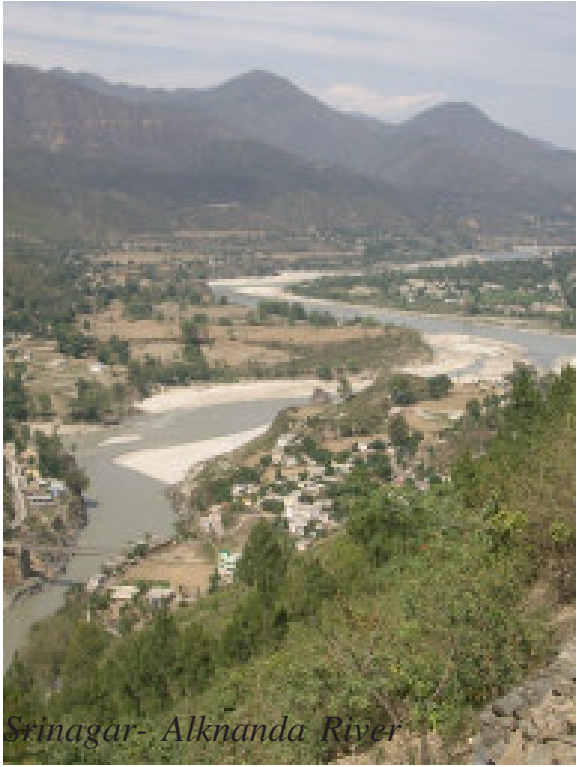
Then and Now



Wood Cutting, Tree Costs 300 Rupees



Then and Now



Srinagar- Alknanda River



Woman works 18 hours Daily



Change in Landform



View of Higher Himalayas

11. Issue of the Capital:

The Study of the Existing Interim Capital and the Nainital Status are quite evident that, the function of the Capital needs to relocate to stop the furthur damage to these cities as well as for the growth of entire Uttarakhand State. With this base study, the inferences were stated as follows:

- 1. To locate the functions of a capital town in a decentralized manner, so that the footprint and impact on the environment will be less.
- 2. The existing developed towns were avoided to distribute the population homogeneously over the state
- 3. Considering the village locations and gentle slope areas to build the capital functions.
- 4. Accepting the peoples aspiration to integrate the two regions of Garhwal and Kumaon.
- 5. Existing Pilgrimage route and the abutting settlements were not considered to retain their character and functions.

Hence, the decentralized Capital or the regional capital has seen in the following aspects to locate the functions of the capital.

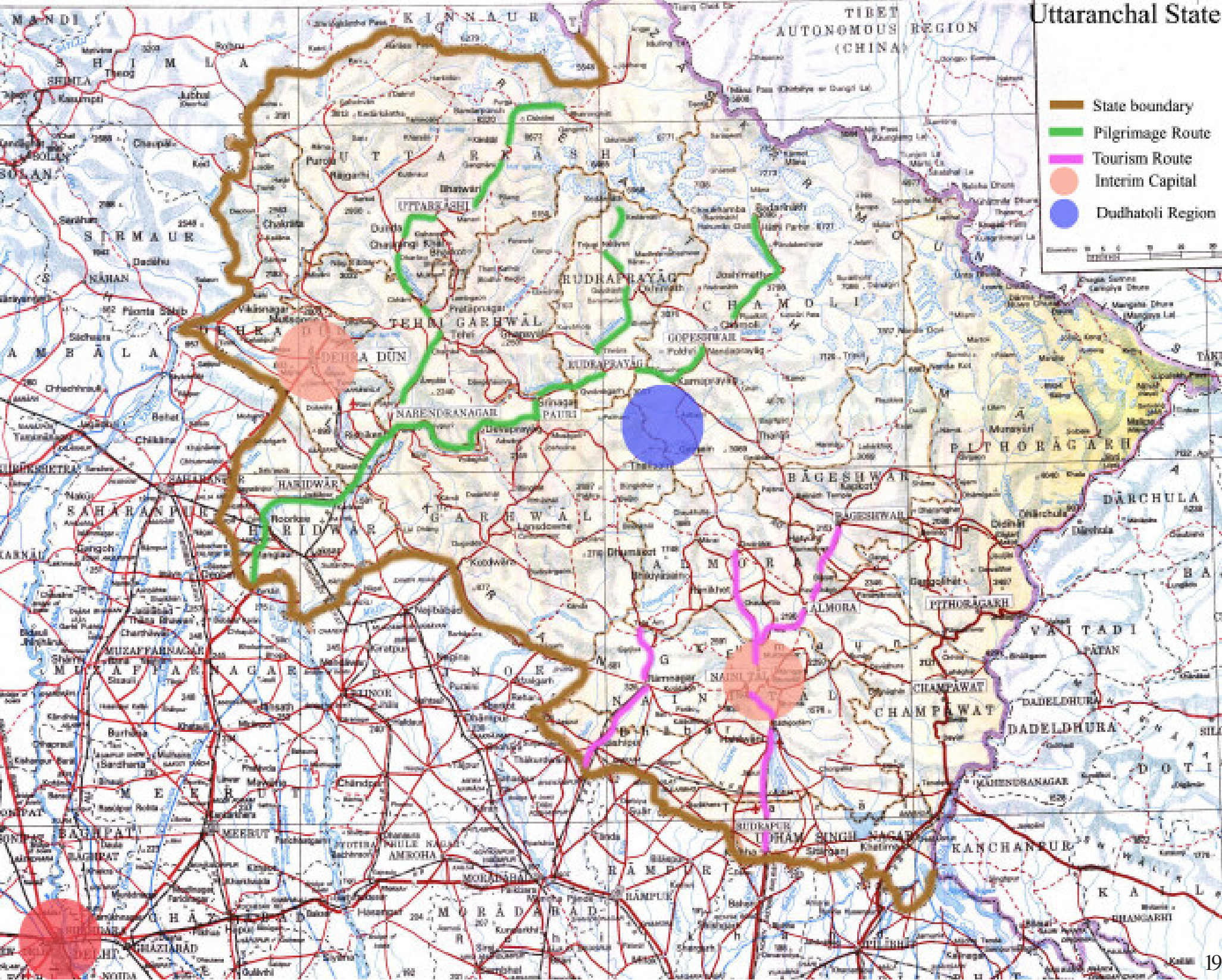
- Macro criteria:** Centrality- Geographic, and Population distribution
Nodality, Connectivity and Accessibility
Transportation modes
Security and Acceptability
- Micro Criteria:** Source of Water
Land availability
Land form, topography and Climate
Electricity
Natural Drainage
Availability of Construction Material
Historical Association.

12. Dudhatoli region:

The Dudhatoli region has chosen to see the feasibility for the capital. In this region, the following settlements considered. These were connected to each in a spider web manner, in order to get a great connectivity to the whole state, physically and geographically. The Dudhatoli forest range was surrounded by these settlements.

The selected region has the following villages/settlements

Thalisain, Gairsain, Bhararisain, Simli



a. Centrality:

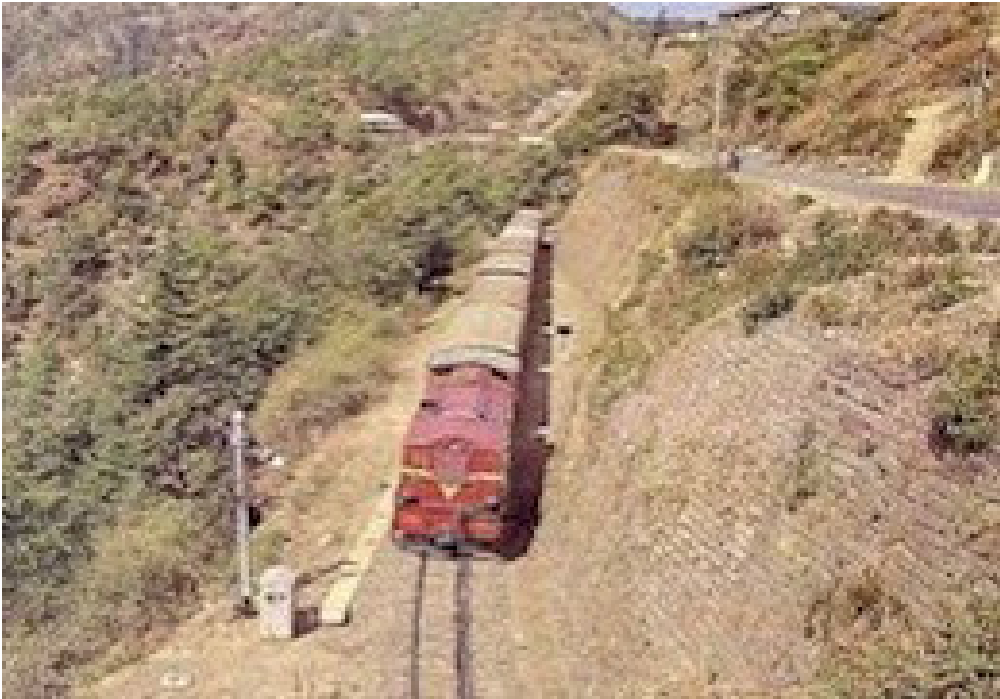
The geographic centre of the state lies on the border districts of Pauri, Garhwal and Chamoli. Culturally, the divisions of Garhwal and Kumaon people aspires the location of Gairsain as the one of the key location for Capital. By population distribution in hilly regions, the centre of absolute population as well as that of population density lies in these two districts.

b. Connectivity:

The transportation modes in terms of roads NH and SH, rail and air are more developed in southern parts of the state. NH 56, 72, 73 and 74 passes through the state. The above places were well connected by road, but the rail route has to be drawn till Chaukutiya, where the studies were done for the possibility. Airstrip is available at Gauchar, which is 2 hours distance from this region.



Environmental friendly roadways



Train could reach Chaukutia



Cable cars- Eco friendly modes

c. Seismic zone:

Geologically Dudhatoli range is less vulnerable for the seismic effect, but the ecological footprint is the most important factor to influence the seismic character. Where as the Dehradun lies in the fourth zone category which is most vulnerable if the development processes keeps in place.

d. Land availability and value:

Since the places are under the population of about 2000 to 3000, and the spread of these population remains for a huge areas, which can be utilised effectively for the constructing capital. Land value is comparatively less than the value in the Dehradun of terai region. Therefore, land acquisitions or pooling can handle smoothly.



Bhararisain- Gairsain View



Chaukutia

e. Topography and climate:

The landforms of these places are considerably gentle slope, which can be handled for the construction purpose. The climate also remains favourable conditions for the most of the months, since it lied in middle Himalayas, the winters remain less temperatures.



Thalisain- gentle slopes



Gairsain- topography

f. Water and electricity:

Several rivers originate from Uttaranchal and as such there is no scarcity of water, but, due to non management of resources, the situation is that of scarcity amidst plenty in several parts of the state. However, in the Dudhatoli forest range the rivers of Purvi and Paschim Nayar, Atagad, and Ramganga Rivers can facilitate the supply of water for this region. Uttaranchal has rich resources in terms of hydro- electricity and this poses no constraint in the location of the capital.

g. Historical association:

Historically the birth place of Chandra Singh Garhwal was one of the legend in the freedom fight movement, lies here in the Dudhatoli range and has a significant importance in Uttaranchal history.

h. Construction materials:

Construction material like granite, gneisses, slates tiles, and limestone, quartzite is available easily. However, bricks and other ornamental, aterials are to be transported from the plains, which is easily done in case of the region due to its proximity to the national highway. Considering these possibilities these locations are suitable for the location of capital region, hence with the historical attachment of the region and Dudhatoli forest range, the entire region is called ‘Chandra Singh Garhwal region’ for the capital project.

13. Gairsain:

Gairsain is located along the road that connects Karnprayag to Ranikhet. This is one of the two major roads that link Garhwal to Kumaon. It is situated at a distance of 65 km from Karnprayag, in the north and a distance of 69 km from Ranikhet, in the south. The nearest important settlement Adibadri, which is the site of one of the four Badri temples, and is at a distance of 48km from Gairsain.Gairsain is situated at the crossroad of Garhwal and Kumaon, the two major cultures in Uttaranchal. As such, it serves as a cultural divide where there has been an intermixing of both the cultures. The river Ramganga has its source near a point quite close to Gairsain and flows beside it, although at a much lower height from the town. The settlement was a part of the kingdom of Raja Chandersingh, the famous ruler of Garhwal. During the British rule of the hills, Gairsain was part of their territory but the Britishers made their presence felt physically when they built the Inspection Bungalow in Gairsain in 1926.

Land use and Settlement pattern:

Table 5.3.1 Landuse of Gairsain Town

LANDUSE	AREA (in hectares)	(%to total area)
Cultivated Land (unirrigated)	33.13	(34.25)
Non-cultivable Waste	33.36	(34.49)
Non-metalled Roads	0.27	(2.79)
PWD Roads	0.71	(7.34)
Zila Parishad Roads	0.04	(0.41)
Pasture Lands	24.84	(25.68)
River	0.32	(3.30)
Built-up Area	4.05	(4.18)
TOTAL AREA	96.72	(100%)

(Source: Sub-Tehsildar’s Office, Gairsain)

The total administrative area of the town of Gairsain is 96.72ha only according to the 2001 Census conducted by the office of the Sub-Tehsildar. It can be clearly seen that inspite of Gairsain being the headquarters of the tehsil of Gairsain and the population being slightly higher than that of a village (according to the census count in 2001), Gairsain still retains some of the characteristics of a vil-
lage.



Main Street Gairsain

b. Climate

At an elevation of 1650 metres, the climate of the area is largely dependant on altitude. The winter season is from mid November to March. As it is situated along the southern slopes of the outer Himalayas, monsoon currents can enter through the valley, the rainfall being heaviest in the monsoon from June to September.

c. Temperature

The annual average range of temperature is around 25 degrees centigrade. In summers the maximum temperature is around 25 degrees centigrade while the minimum temperature is around 14 degrees centigrade. The maximum winter temperature hovers between 12 to 7 degrees centigrade. There is snowfall in the months of January and February. The snowfall is between 2inches to 4 feet. The snow accumulates for a day or two.

d. Rainfall

Most of the rainfall occurs during the period between June to September when 70 to 80 percent of the annual precipitation is accounted for. The effectiveness of the rains is, among others, related to low temperature which means less evapotranspiration from the forests and vegetation cover. This indicates that the soil moisture in the area is well preserved. Skies are heavily clouded during the monsoon months and for short spells when the region is affected by the passage of western disturbances. During the rest of the year the skies are generally clear to lightly clouded. According to the data collected, the average annual rainfall occurring in the town is 1433mm.

e. Humidity

The relative humidity is moderately high during the monsoon season around 60 percent but the unpleasant effect is offset by the winds which make it less oppressive. The driest part of the year is the pre monsoon period when the humidity may drop to 35 percent during the afternoon. During the winter months the humidity increases toward the afternoon generally.

f. Drainage Pattern:

The rivers Kali, Gaula, Kosi, Western Ramganga, Ganga, Yamuna and Tons drain this region. The Western Ramganga rises on the northeastern slopes of the Dudhatoli ranges. It is an antecedent river and flows transverse to the structural axes in gorgeous channels, with irregularly terraced patches of subrecent gravelly and sandy deposits along their paths, in the inner sedimentary belt of comparatively gentle gradient and milder topography. The small streams (gad) and ravines (gadhera) feeding the main rivers flow in a radial pattern in the Dudhatoli massif with the Ramganga flowing northeastwards, the Binau towards the southeast and the two Nayars draining southwestwards.

g. Slope and Topography:

Gairsain, situated at a height of 1650 m has an unusually gentle topography compared to the other areas of equivalent altitude in the Garhwal region. The slope of the land in the lower regions or ‘khet’ is around 30 degrees while along the higher slopes it is around 40 degrees.

h. Soils

The types of soil found here are generally the same as found in the hilly areas comprising gravel sand, sandy loam, clayey loam, heavy clay and calcareous soils. The soils maybe divided into 3 categories. One is the red soil found on the slopes and generally sandy is grayish brown when dry and reddish when moist. The brown soils, found in the forests and fields near the forests, varies in colour from brown to dark brown depending on the quantity of organic matter contained therein. The podsol soils, clayey in texture, are generally found along the terraced fields. Gairsain comes under the Ramganga Soil Conservation Project that was initiated to contain the advancement of siltation in the Kalagarh dam. This project, covering the catchment area of the streams feeding the dam, has its head offices located in Ranikhet.

i. Earthquake risks:

Srivastava and Dattatrayam (1986) converted data on body wave magnitudes (for the period 1962-1976) into surface wave magnitude to understand the effect of different magnitudes over recurrence intervals. No satisfactory conclusion could be drawn for this region due to lack of sufficient data. However, in general it was found that the result of increase in the assigned value of fictitious magnitude for the gap years was found to decrease and increase the return period of earthquakes of magnitude less than or equal to 6.5 and greater than 7.0 respectively. It appears that the entire Himalayan region ranging from Hindukush to the Nicobar islands is susceptible to damaging earthquakes of magnitude 6.0 and more with the recurrence intervals of 2 to 10 years. It has been found that the recurrence intervals for earthquakes of magnitude 8.0/6.0 using Gumbel’s extreme value theory works out as 222/11 for this region. Gairsain itself is located along an anticlinal thrust plane of the Almora nappe. More importantly the whole of Uttaranchal is susceptible to major earthquakes even though a small strip of the dun area falls within Zone IV. Since earthquakes cannot be prevented and their early detection still an uncertainty, the best solution at this point of time would be to make the area as earthquake proof as possible. This includes safe building codes in case of construction, spreading awareness about the steps to take once it happens and a comprehensive disaster management plan by the authorities to provide relief immediately after the occurrence of an earthquake.

j. Population Characteristics of Gairsain

Year			
Description	1981	1991	2001
Total Population	2895	4228	6258
Growth rate	—	0.4%	—
Density (per/ha)	30	44	65
No. of households	—	878	—
Sex ratio (females/1000 males)	—	875	880
Literacy	—	—	65.02%

(Source: town and village directory, district Chamoli, 1981, 1991; provisional totals for census 2001, Sub-Tehsildar’s office, Gairsain)

14. Scenarios of the Regional Capital : Chandra Singh Nagar

Considering these facts, the regional capital for the Uttarakhand has been visioned as the Dudhatoli region. With the aspirations of the Uttarakhandi's the region has been named as Chandra Singh Nagar. The Connectivity between these towns are basically by the Road network only. The route between Thalising and Bhararising is Totally pedestrian way since it comprises the great valleys and mountain regions. This gives the excellent opportunity to introduce the cost effective cablecars, and foot bridges to connect all the underdeveloped places for their positive growth. Hence the peoples economic and regional imbalances can be addressed through these approaches.

The innovative and technological advancements in the field of ITsector, Bio Technology, Horticulture, and Tourism can be Used to improve the life-style and standards of the people of Himalayas. The important aspect of Land, Water and Forest Lands can be dealt easily with the politicians in a holistic manner in which the mountain peoples involvement can be seen through the shift of Capital Activities from the Plain region to the Mountain Region.

15. Decentralization: Definition and Conceptual issues:

The term 'decentralization' is given a variety of connotation by different users and confusion abounds in respect of the relationship between decentralization and related terms, including on the one hand 'centralisation' and on the other hand terms such as 'devolution' and 'decentralization'. Although the term 'decentralization' is used in a wide range of contexts, here decentralization is dealt specifically with decentralization of planning and government. Thus decentralization is any change in the organisation of planning and government which involves the transfer of powers and functions from the national level to any sub-national level(s) or from the sub-national level to another lower sub-national level. This definition is not universally acceptable because (some prefer a narrower definition, comparable to what some call devolution), while other use the terms more broadly to include also the transfer of power or functions from government organs to parastatal or non-government organisations. It is important to consider decentralization, whether of government or planning, as a process of change rather as an end in itself.

16. Capital activities and its decentralisation:

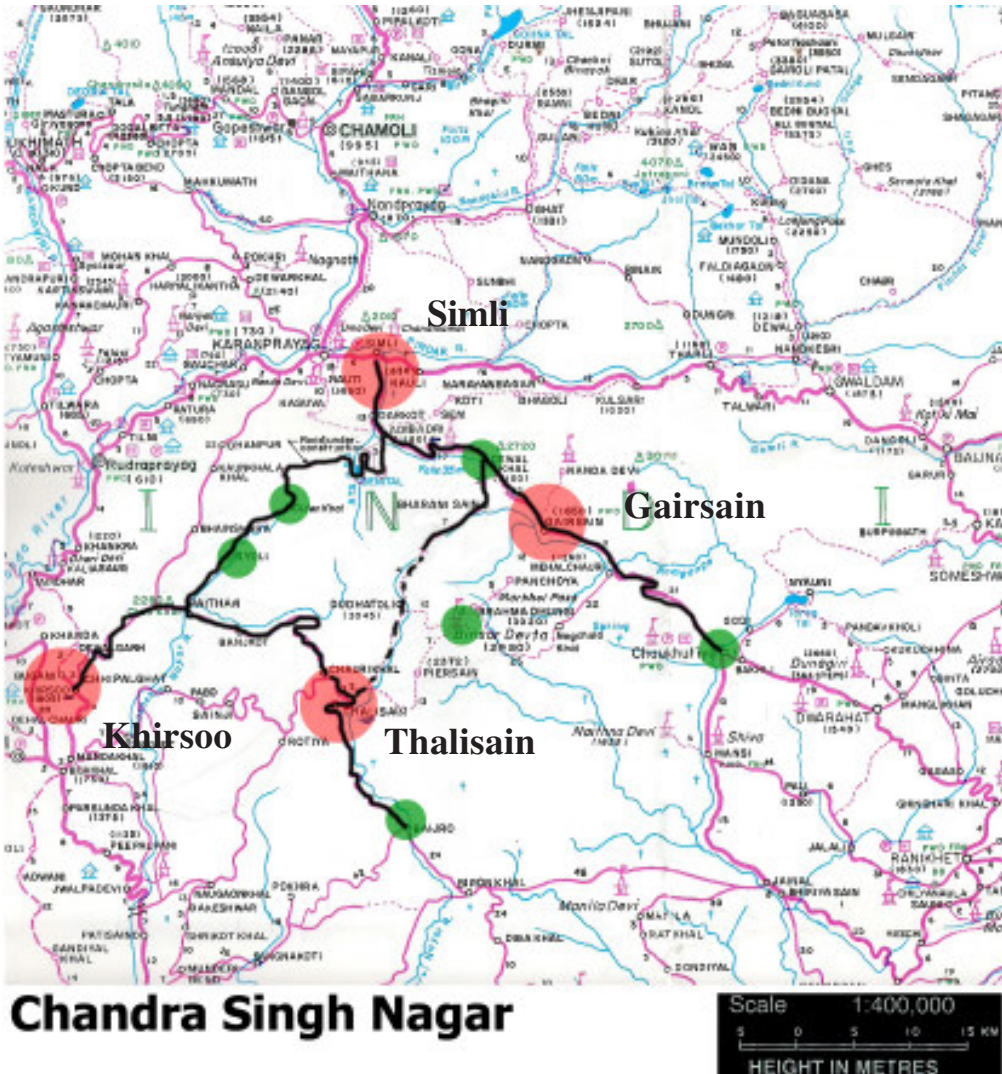
In India, the position of the capital city, at both the national and the state level, shows a clear first hierarchy than the rest of the cities and towns. The notable exception is that of Gandhinagar in Gujarat, which has become a study on what not to follow while experimenting with a new capital. For the rest of the states, the capitals are the most important cities in the states, occupying a position of primacy, and this is the result of both historical and present day processes. They are the headquarters of the administrative and other miscellaneous functions of the state.

Formally speaking, the functions of a capital can be categorised into three broad divisions:

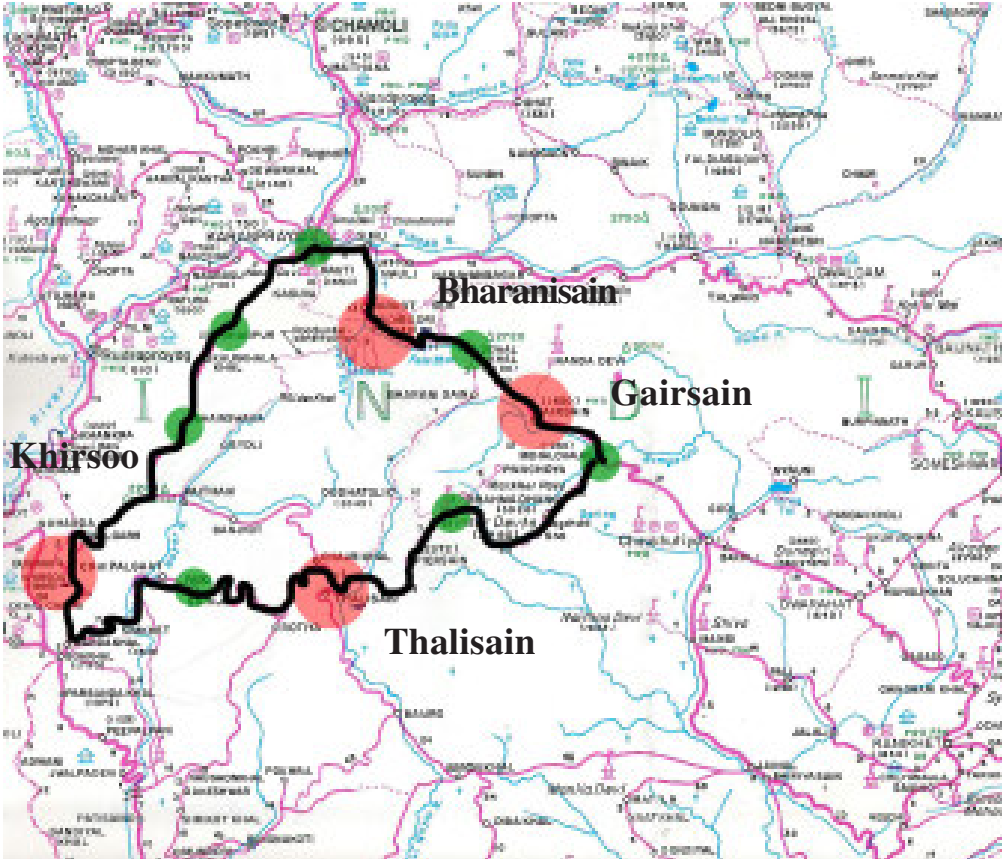
- Executive
- Legislative
- Judiciary

The supporting requirements of social, physical infrastructure, residential, commercial, institutional, recreational, open spaces needs to provide for the capital city. Hence, the idea of decentralising the functions of a capital city has been designed as follows.

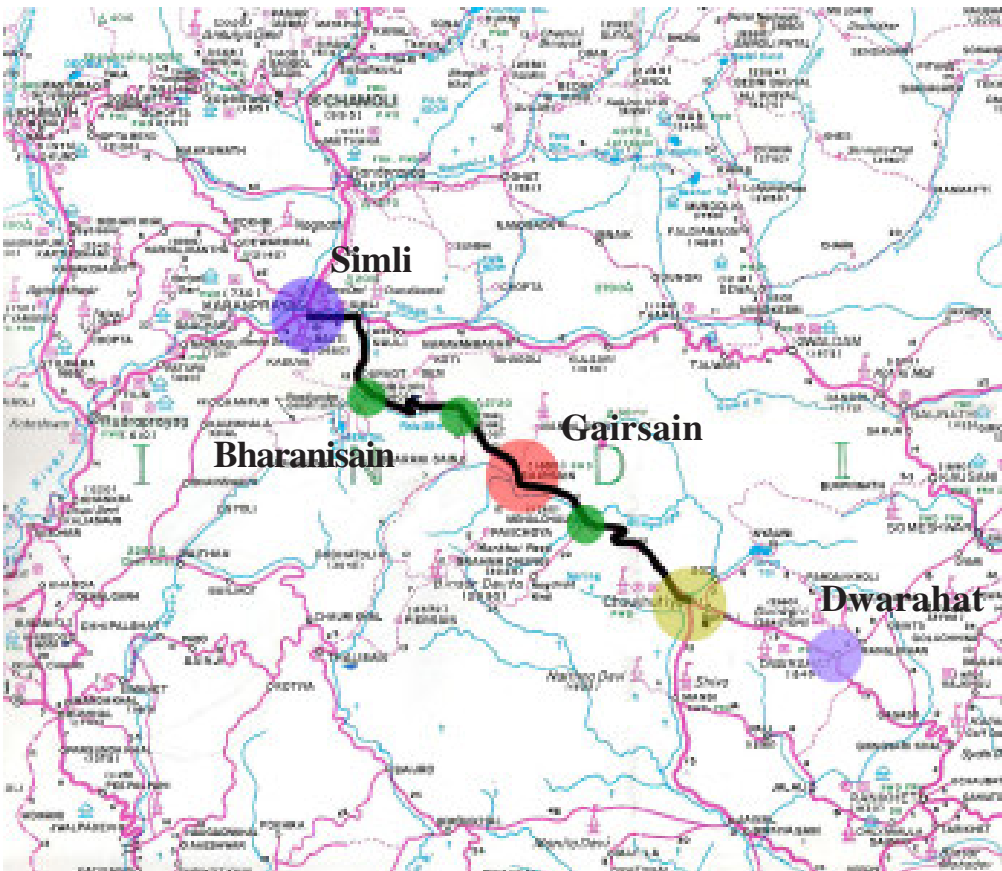
- Gairsin: State Assembly and residential and institutional zone
- Bharai sain: State High court, Secretariat.
- Simli, Gaucher: Air port Facilities
- Thalising: Tourism Sector
- Khirshoo: Major Institution Sector.
- Chaukutia: Railway Connectivity to the Regional Capital
- Other settlements will contain the supporting residential, commercial and institution sectors.



Regional Capital Scenario -01



Regional Capital Scenario -02



Regional Capital Scenario -03

17. Macro plan:

The potential corridors for the capital township has been considered in two ways in which, one show the integration of the Dudhatoli forest range which is the circular networking of the village network and the other one is ribbon corridor which connects the village network in a linear pattern enabling to strengthen the connecting route between Garhwal and kumaon. In both cases the macro plan suggests the reinforced network system in order to make a regional capital for the Uttarakhand State. The functions were assigned as described earlier.

a. Classification of Hill Settlements:

The villages, which are considered for the development towards regional capital comes under different physiological character with respect to the land and contours. Hence certain design principles were suggested according to the existing situation with abstract plans. Primarily they are categorized as 4 types with its location.

1.Valley , 2.Hill top, 3. Spur, 4. Gap.

These types of settlements were documented in uttaranchal state to understand the architecture, siteplanning, and life. The advantages and disadvantages were mentioned to guage the appropriateness of space making and place making in design process.

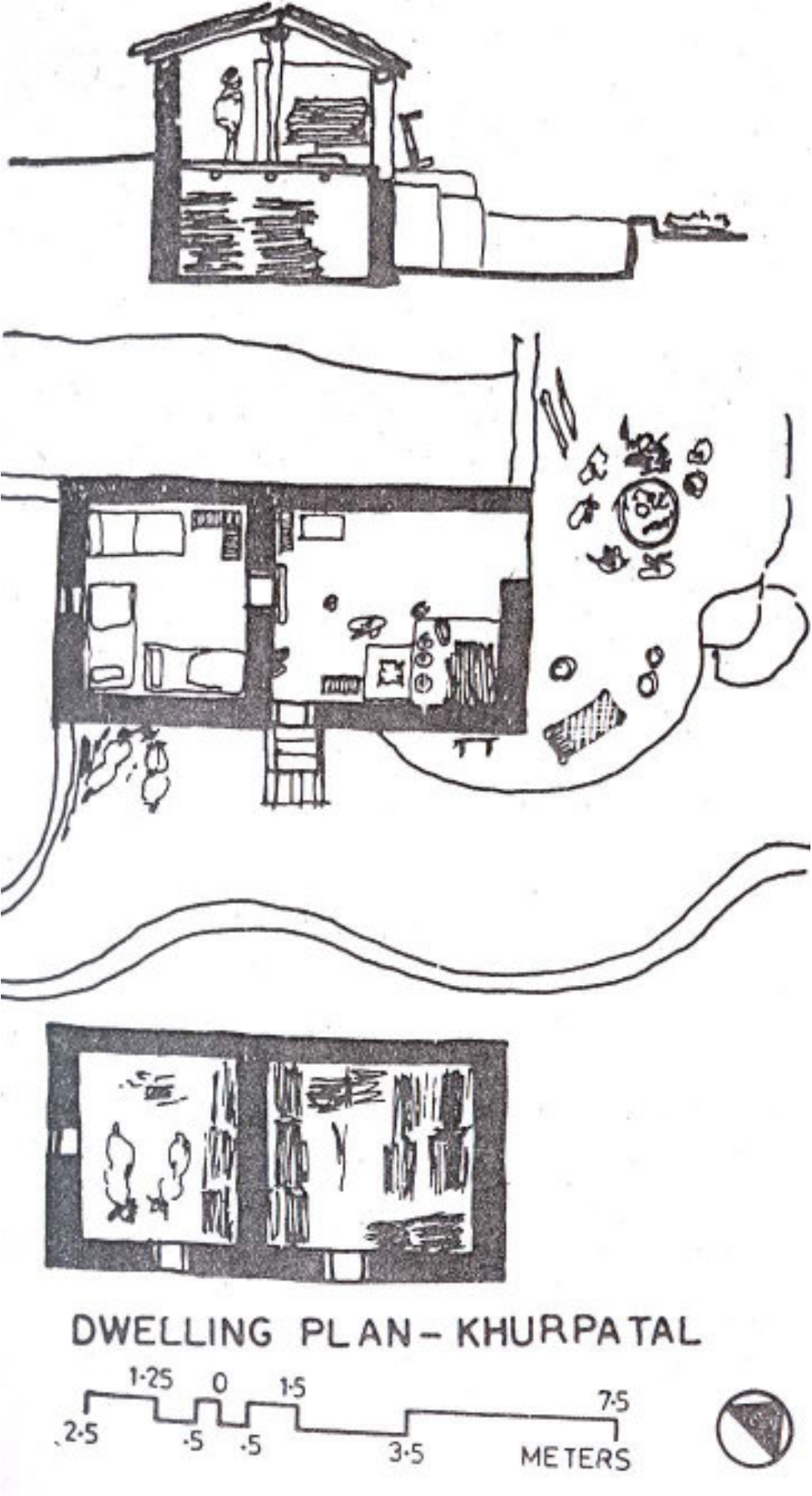
b. Valley Settlements:

Advantages-

- Centrality,
- Adequacy of space for physical expansion,
- Easy accessibility of water,
- Easy convenience of laying transport and utility services network,

Disadvantage-

Due to the presence of river system or water body and its catchment, loss of fertile lands.



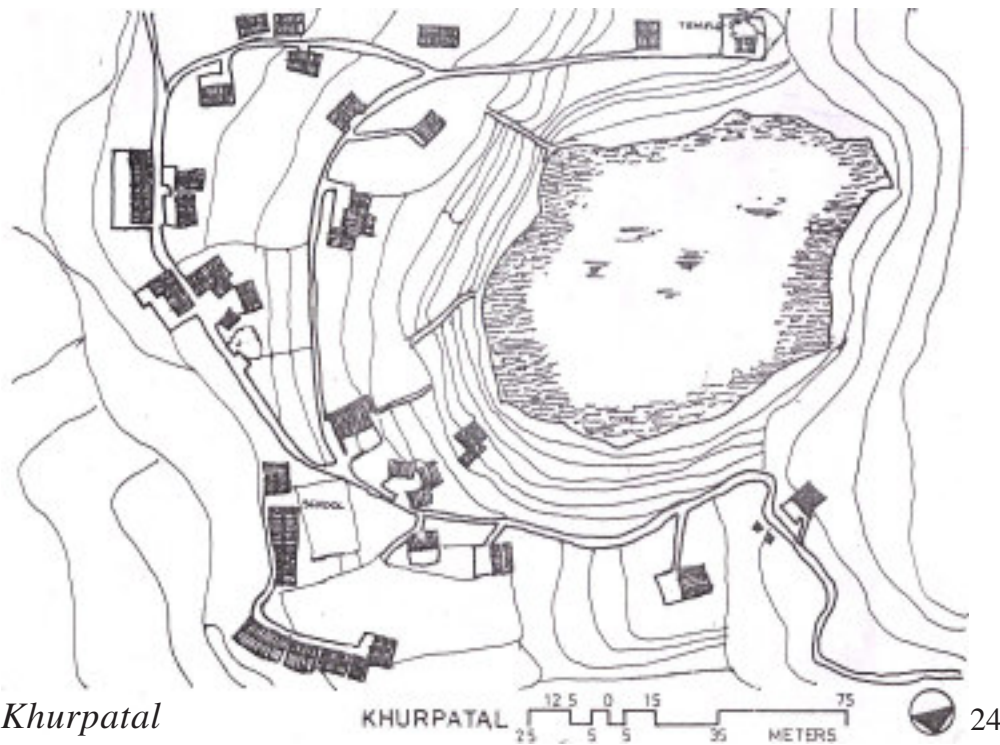
Gairsain



Chaukutia



Thalisain



Khurpatal

b. Hill top Settlements:

Advantages-

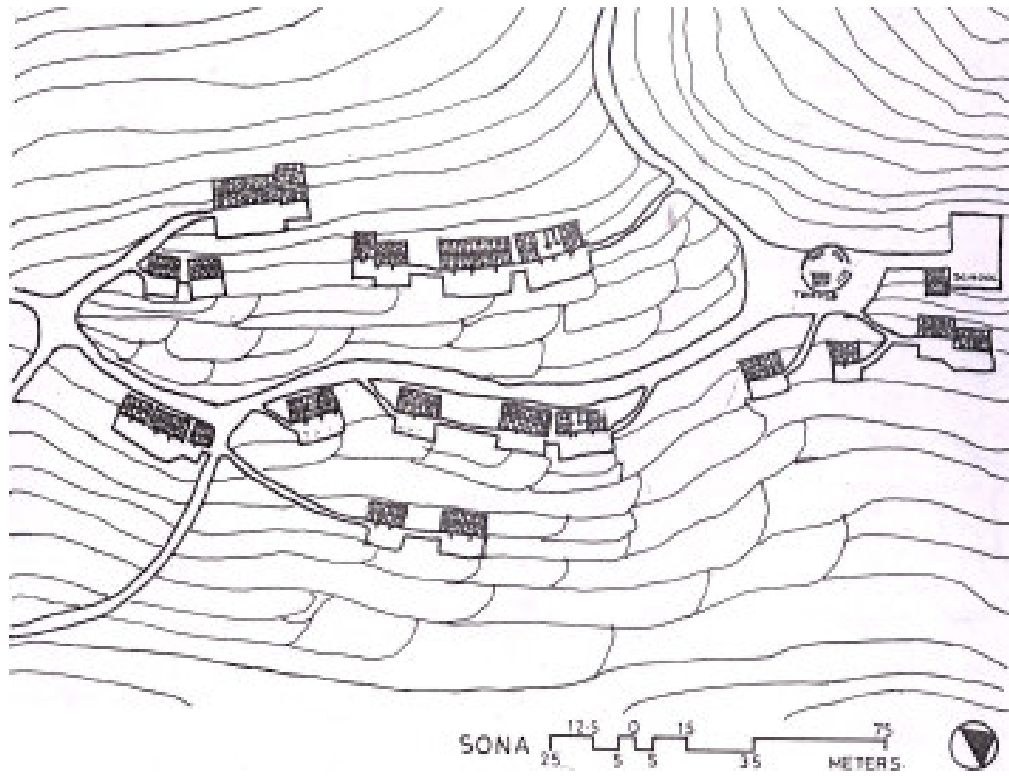
- Healthy climate
- Scenic beauty
- Strategic position and free drainage

Disadvantage-

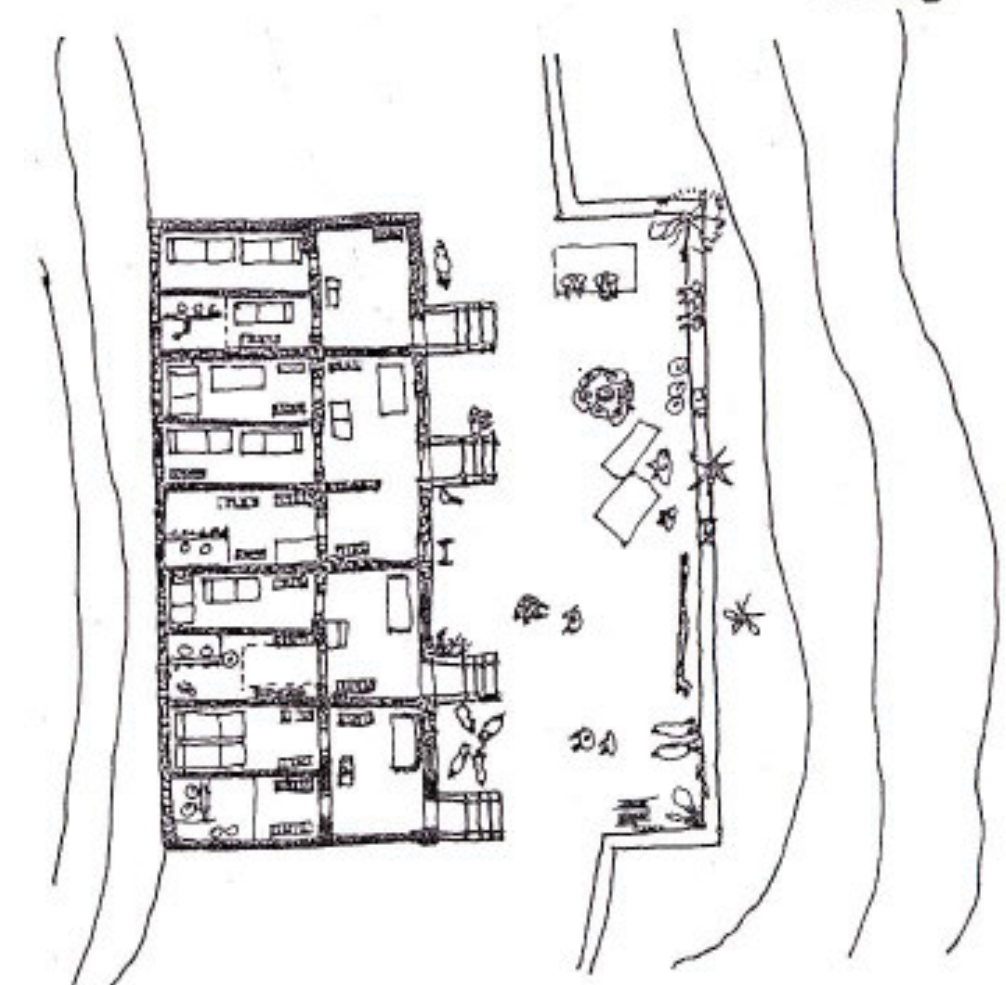
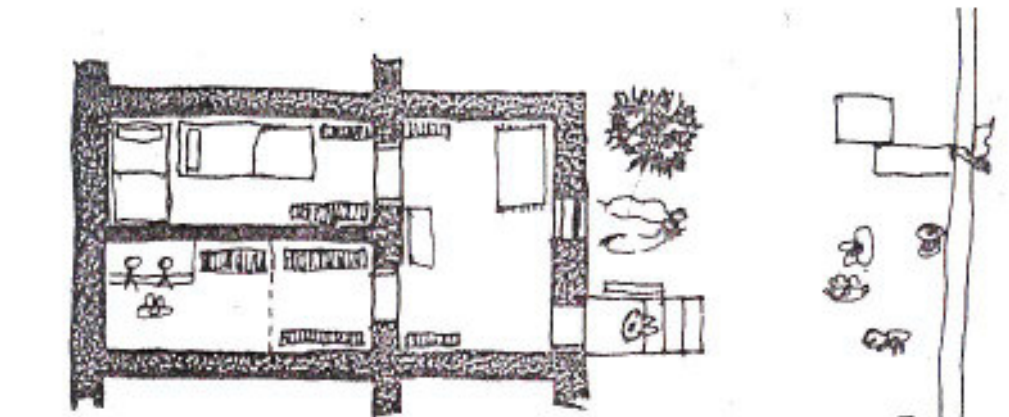
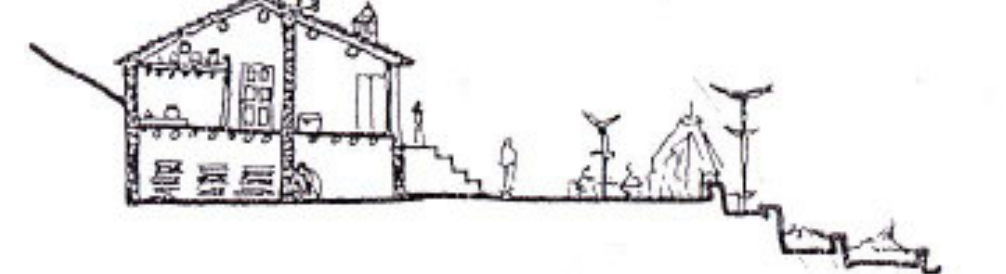
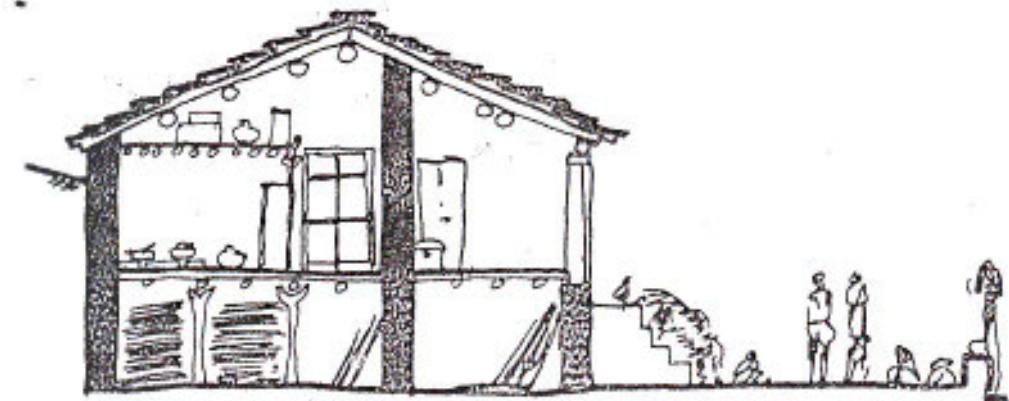
- Virtual absence of flat land
- Lack of water supply
- Inconvenience of intra resorts mobility



Narendra Nagar

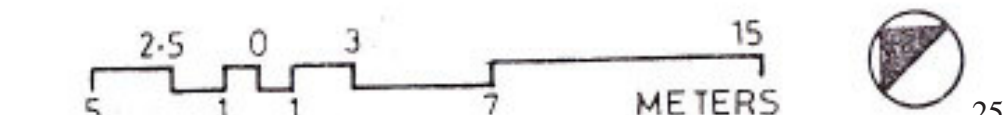
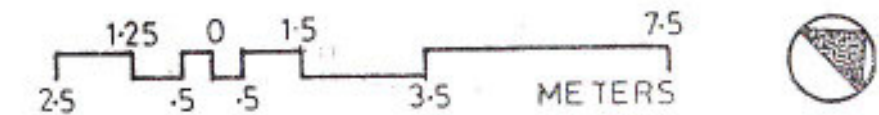


On the Route Towards Thalain



DWELLING PLAN - SONA

CLUSTER PLAN - SONA



c. Spur:

Advantages-

Transition between valley floors and hilltops
Natural defense
Panoramic Landscapes and moderate climate
Limited loss of agricultural field

Disadvantage-

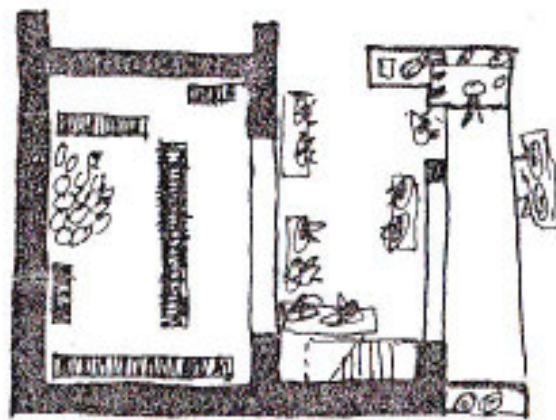
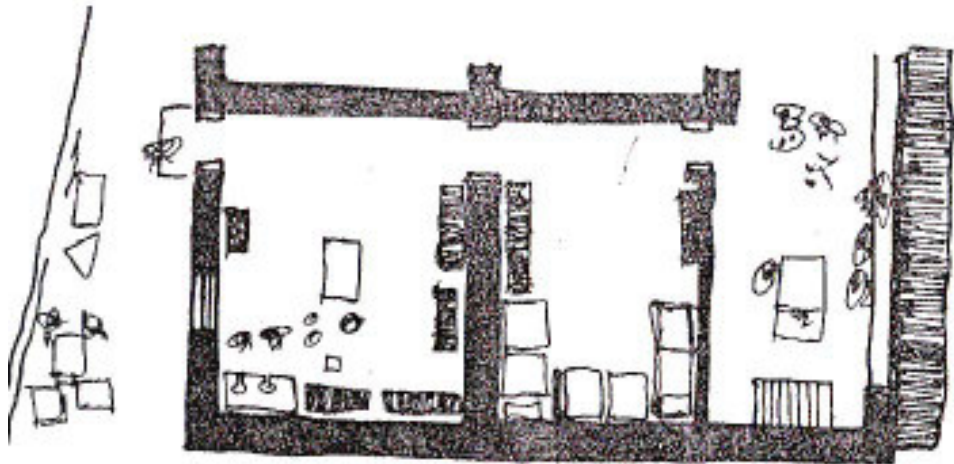
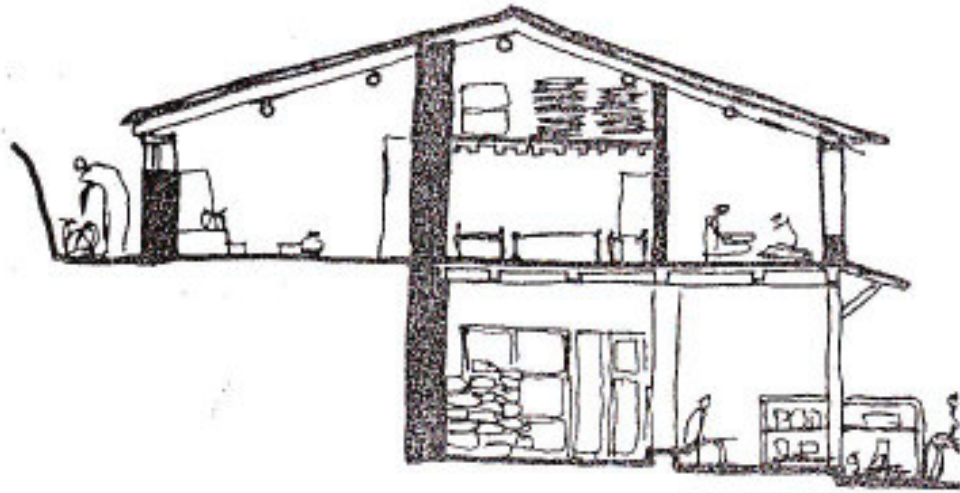
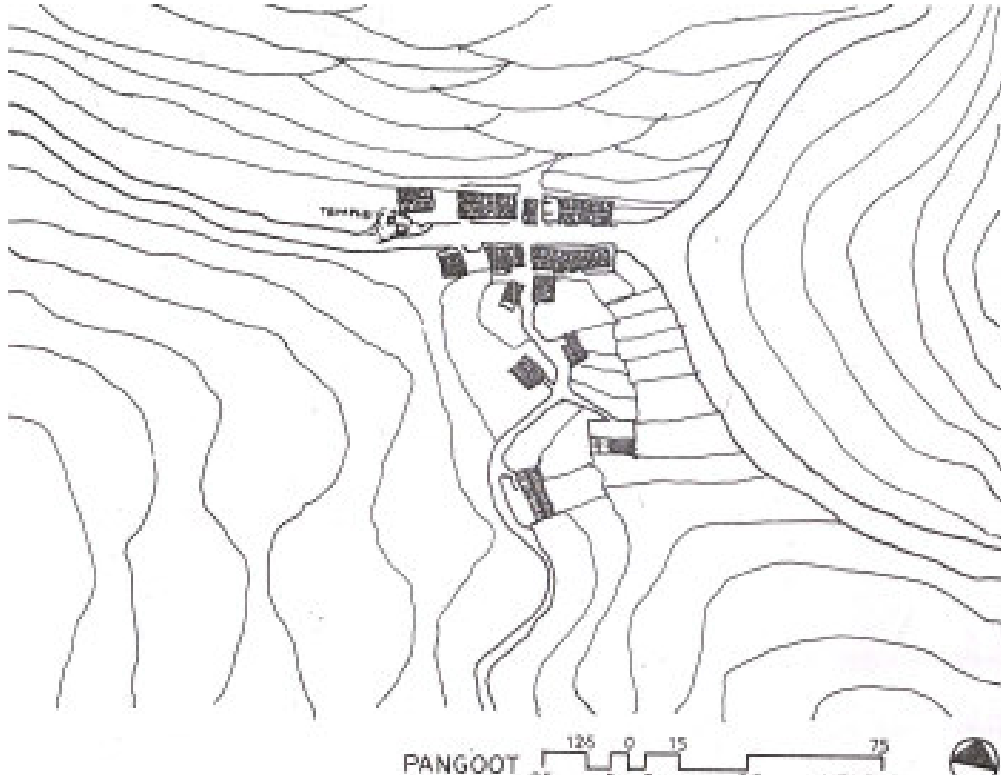
Restricted accessibility
Difficult intra site mobility
Frequent landslides
Constraints in space for expansion



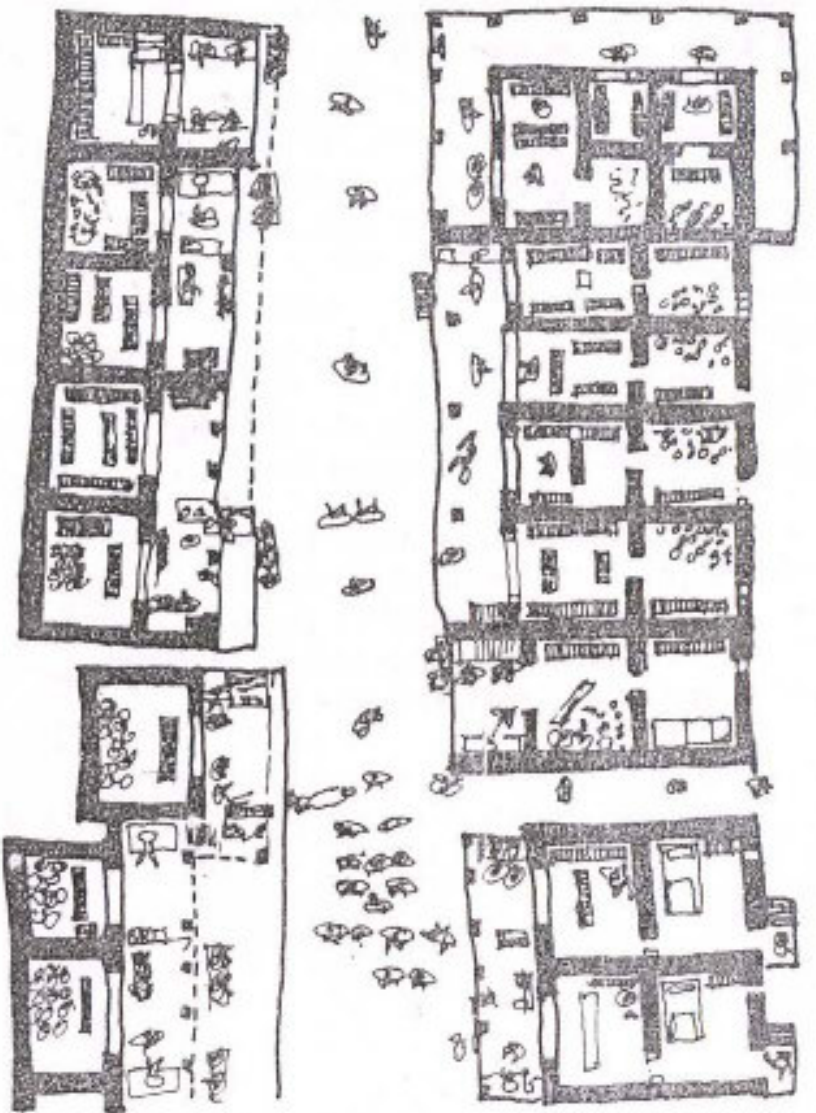
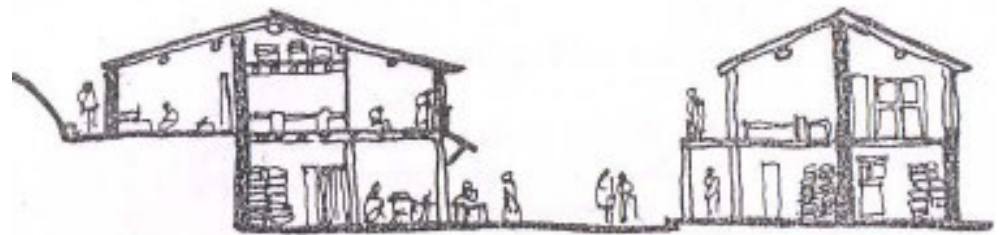
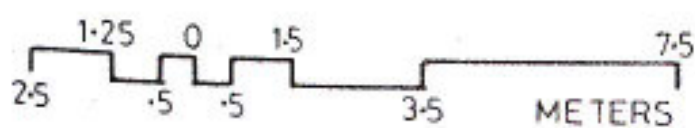
on the Route Towards Pauri



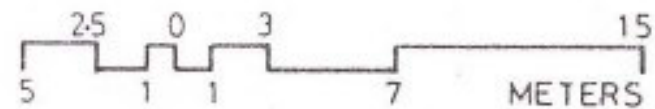
Pauri



DWELLING — PANGOOR



CLUSTER — PANGOOR



e. Gap:

Advantages-

- Enjoys Nodality
- Convergence of routes makes the transit points
- Immense Water availability

Disadvantage-

- Constraints in space for expansion



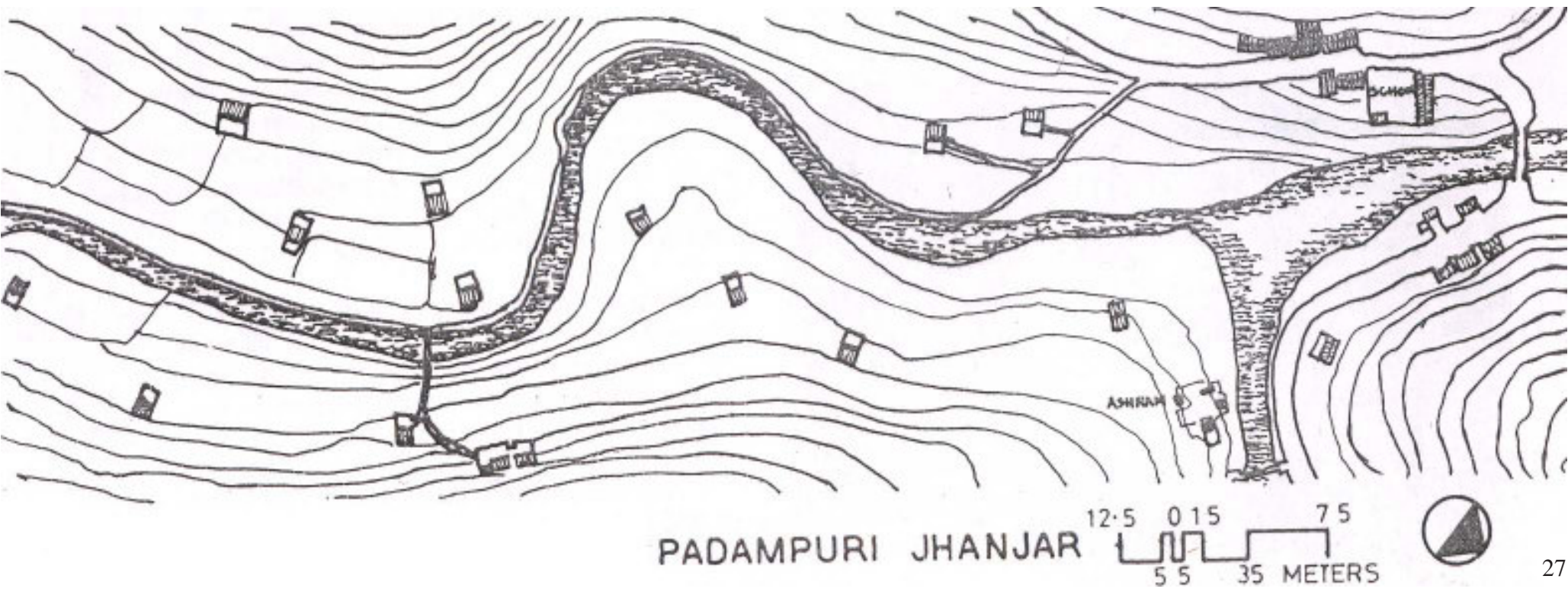
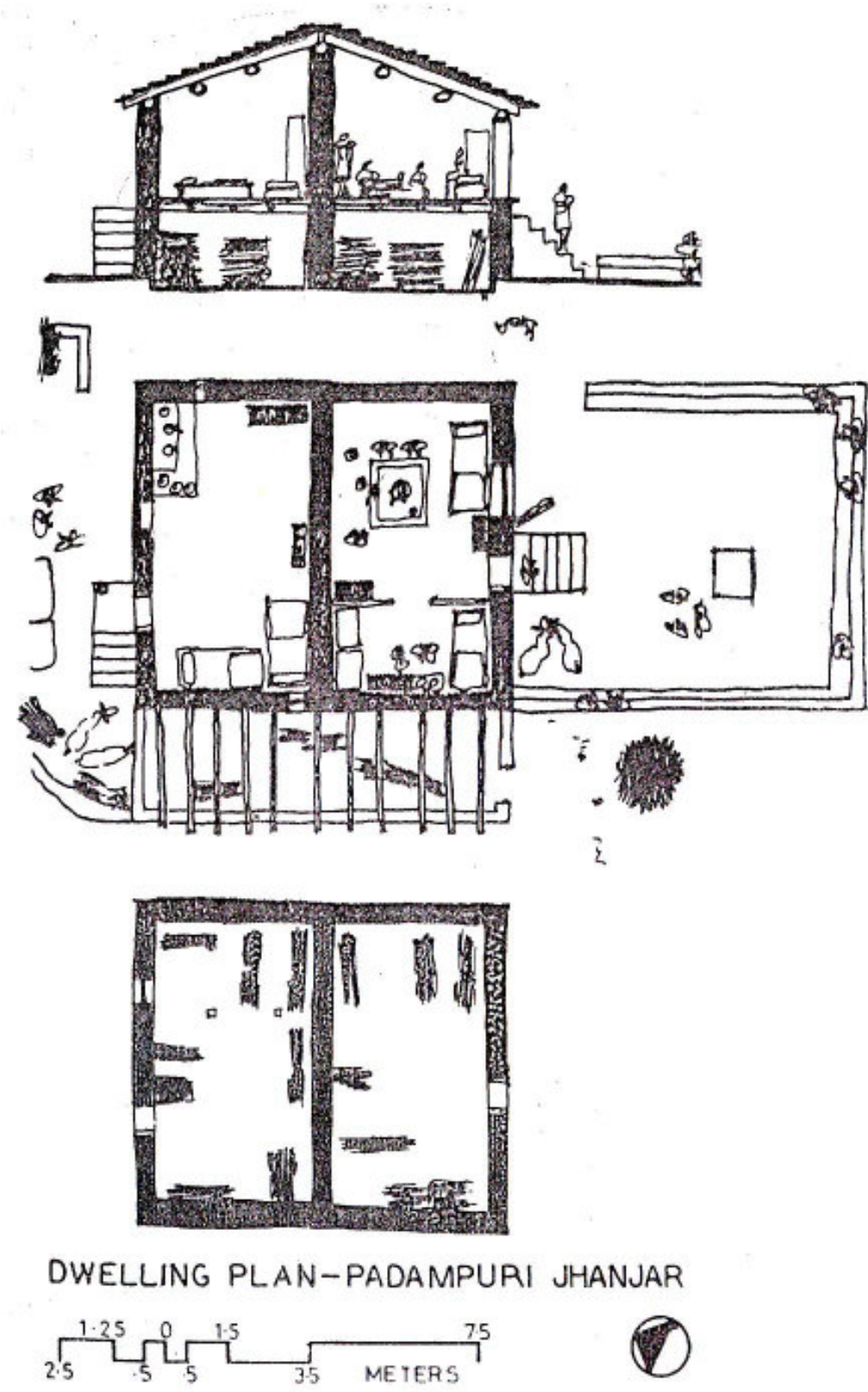
Srinagar



Devprayag



Karnaprayag



18. Micro plan, design principles:

The previous case examples and the case study of Existing settlements pattern, architecture and the dwelling unit of the native settlement shows the appropriate use of the material and style of the building to fit with the natural surroundings. The idea of the Capital is based on the strengthening the local communities and their culture in order to reinforce as well as to conserve the Himalayas. The design principles are basically to visualize the future growth pattern for Landscapes of Himalayas.

a. Landuse:

This important component of any settlement pattern determines the rich combination of life, culture and its environment in a holistic manner. Hence, the design should aim to encourage the mixed Landuse for a lively atmosphere. Historically settlements have developed with the same concept of mix landuses for their existence with all economic and cultural activities. Since the constraint of the land in these areas, the Landuse pattern should aim to inter relate the activities of local people and visitors.

b. Network systems:

The regional capital is predominantly dependent on the network systems of road, rail and cable systems. Road network is prone to effect more due to the increase in the traffic from across the state, hence, the network has to reinforce with two tier systems or widen where ever it is possible between the settlements. But with in the villages traffic management has to put in place to control the movement pattern.

About 64 percent inhabited villages of Uttarakhand are connected by pucca roads and the remaining 36 percent villages- mostly smaller settlements located in difficult situations in the upper reaches- suffer from remoteness / inaccessibility. Out of the 16177 villages in the state, roads till the end of March 2003 connected 10260. Approval had been given for construction of roads in a further 1166 villages. A study of road connectivity reveals that Garhwal has the highest number of villages connected by road followed by Tehri Garhwal and Almora.

Rail: Rail Transport is very elementary in Uttarakhand. The total length is 356 kilometers, which translates into 6.66 kms for 1000 Sqkms of area in term of density of route length. While this is highest amongst the hill states, it is far lower in comparison to other states in the country. Dehradun in Garhwal and Kathgodam in Kumaon are the two main stations in Uttarakhand.

Airports: Jolly Grant near Dehradun and Pantnagar are the working airports in the state. There are regular flights to Delhi by Indian Airlines. The airport is proposed in Gauchar for the benefit to the people who travels to Badrinath and further. But it is not developed properly yet to be operational.

Footbridges: Entire Uttarakhand, one will find connecting bridges from one hill to other, for the pedestrians as well as to transport goods for the remote places which are not connected by the public transportation system. These play very important role in the state's movement pattern, which have very less impact on the environment.

Rope ways: Very effective to scale the great heights as well as lengths with cost effective and environmental friendly. The use of this mode is very less in the state, but needs to emphasis the importance to retain the fragile environment here.

c. Pedestrians:

Pedestrians are the highest priority in designing the road network, because, the mountain regions people engage themselves mostly by walk for their activities. Hence, the footpaths and the safety should be main consideration in laying the roads. History showed us the importance of pedestrians in the way of Mall roads, which are totally pedestrian friendly. Thus the incorporation of pedestrian streets are one of the main design feature of the Regional capital.

d. Landmarks:

Landmark gives the identity of the place to recognize and to remember further in any urban context. These can be of any institutional buildings, buildings in Monumental Character, Sculptures, Statues, and any important activities also. The undulating landscapes give the greatest opportunity to explore and to give identity with landmarks. Hence, the design should permit to give the scope of giving identity to the places with these landmarks. For instance, the Townhall, Public Library, Administration building, should be places in such a way that they should form the urban memory for the inhabitants and visitors.

e. Building vocabulary:

It consists of building Function, materials, heights, architecture style, and its relation to the other buildings. These inter related layers should make a meaningful structures to suit the conditions of the land, slopes and climate. The various existing styles of Garhwal, Kumaon, indo-Saranic, and Gothic styles can be used to give the different meaning to the various functions of the buildings. These styles gave us the character of native, monumental, and functional elements to our buildings. The use of pedestrian corridors, arcades relation to the public spaces and open spaces should be fit into the style of the buildings to give the sense of identity and sense of the place.

f. Residential sector:

Since the topography guides the development pattern these residential units have to be designed to suit the local people's daily activity and life style. Hence the flexibility in space planning and the open spaces plays a major role in the layout. The earlier construction of the housing units and its placement shows the way of approach in which it breaks the monotony, and allows spaces to flow through them accommodating the pedestrians to scale the contours. For ex the aerial view of Thalain and New Tehri

This residential sector is basically dependent on the infrastructure facilities like water, electricity and sewerage. So careful laying of infrastructure is also a major component in guiding the morphology of the settlement pattern.

g. Water management:

Even with the presence of India's most sacred and important rivers in Uttarakhand, the crisis for water is always there, due to the undulating landscapes and bad water management of rain water and ground water. The various groups of Go's and Ngo's taking initiation to make people to aware of the problem in coming future and teaching the water management systems to recharge ground water and tap rain water for various purposes. The role playing by these organizations is very important to build up the community based settlements to carry forward the of the capital project in the mountain region.

h. Environment of Himalayas:

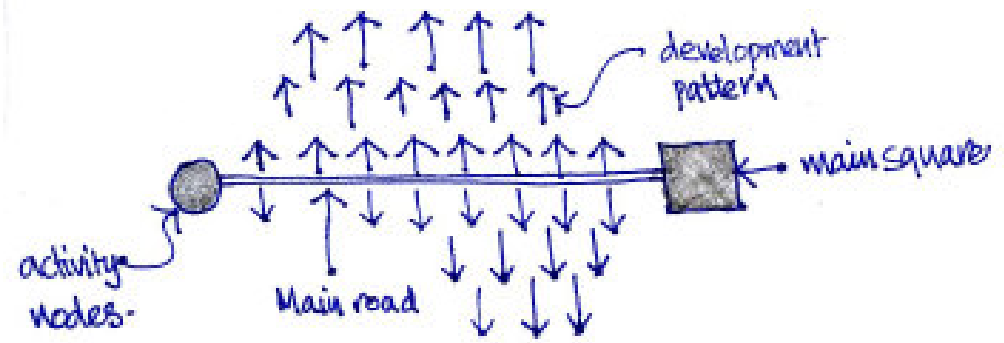
Urbanization is always a threat to the Environment of any given region. It takes all resources of water, land, vegetation and entire ecology. The sensitive region of Himalayas are prone to various natural calamities like landslides, and earthquakes etc. in order to minimize the impact on the environment, the density pattern of the settlements and the ecological foot print has to be controlled for its further decay. Therefore, the design of the region capital has to address these issues carefully to give an identity to the Hill State of Uttarakhand.

19. Micro plan, Design Abstractions:

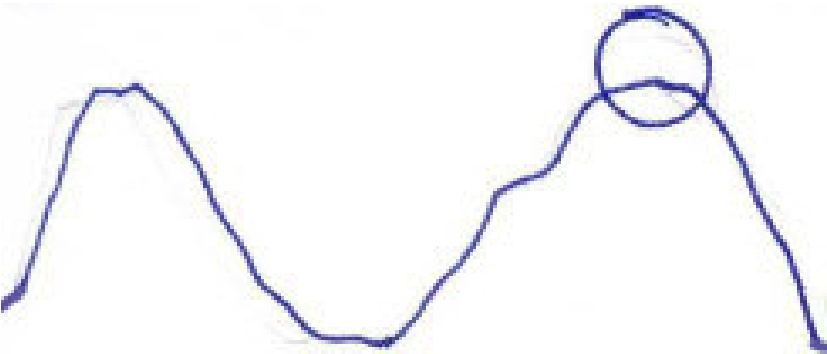
For the Convenience of the Design Layout, Abstract site has been taken and demonstrated the important components to be incorporate in such conditions. These abstraction were purely hypothetical and can be adjustable for the specific site location in detailed design exercise.

Hill Top Settlements:

Its an important strategic location since from early, colonial periods. Hence the Design abstractions were considered with the conception of those design principles to suit the Hill Top location.



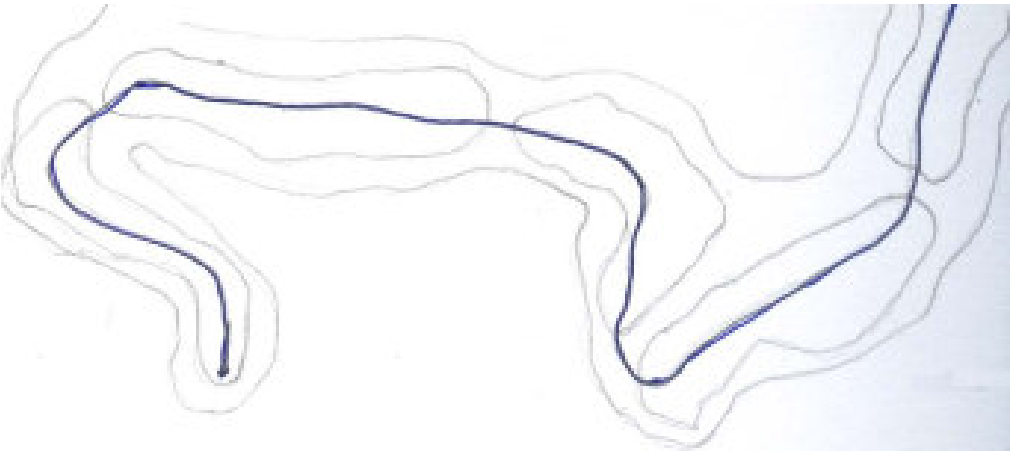
Conceptual Design Process



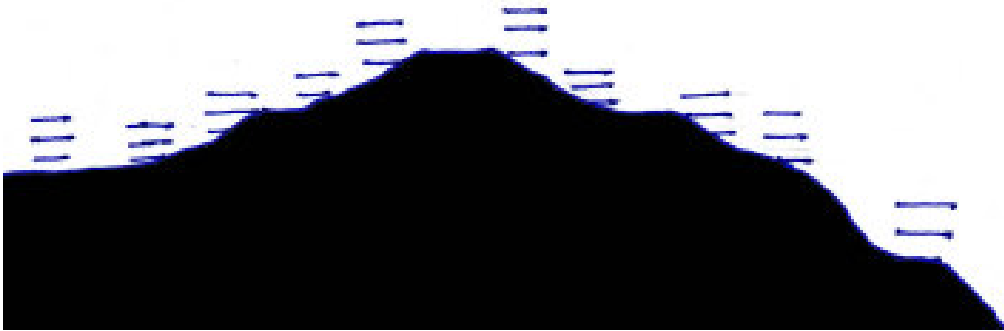
Location



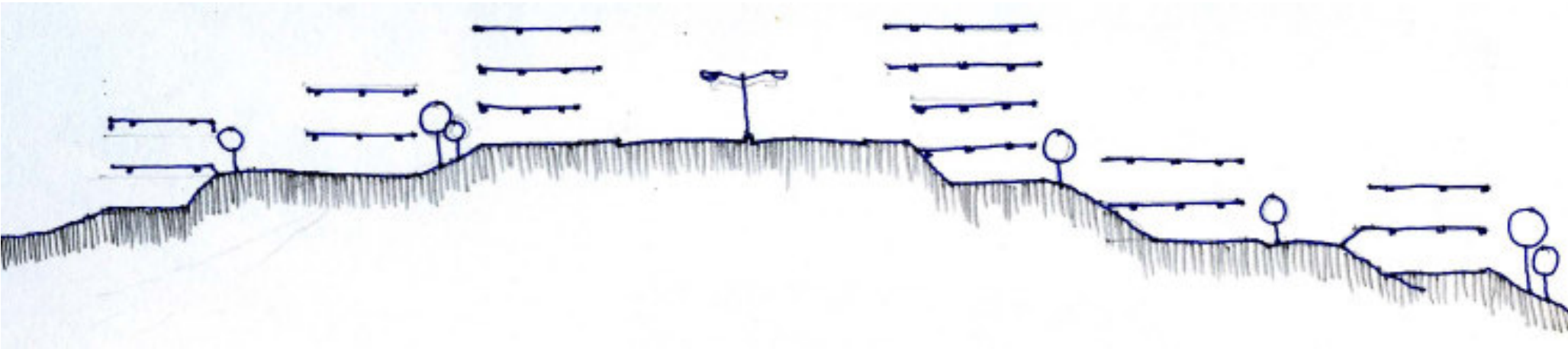
Abstract Site plan- Design



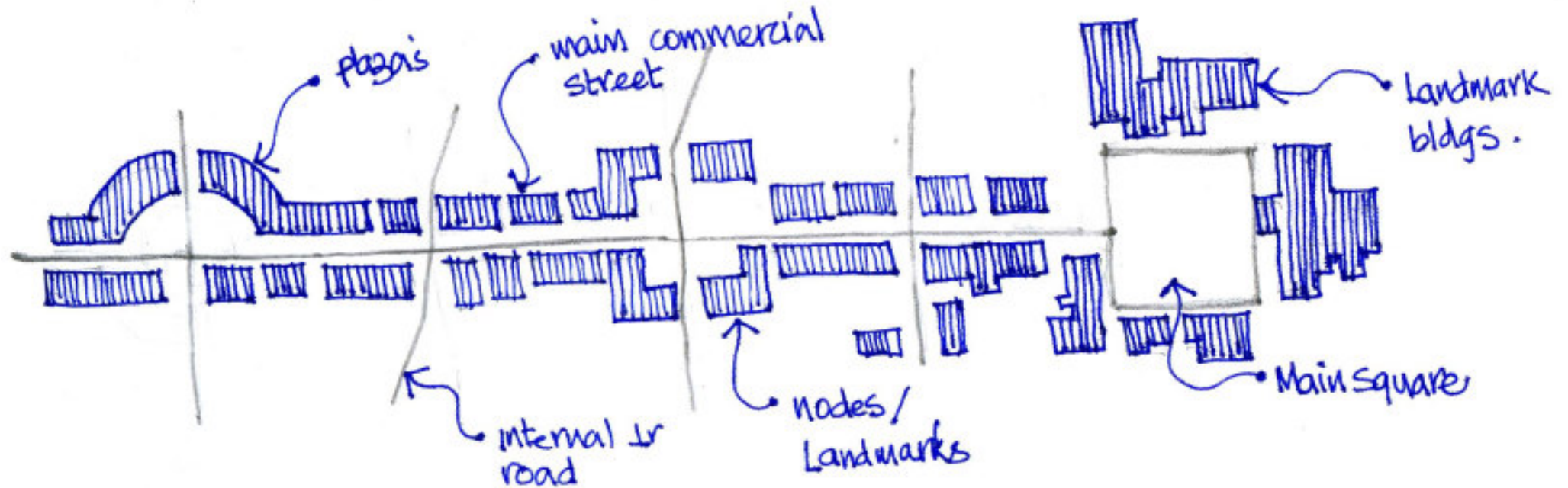
Abstract site and Region



Abstract Site Section- Design



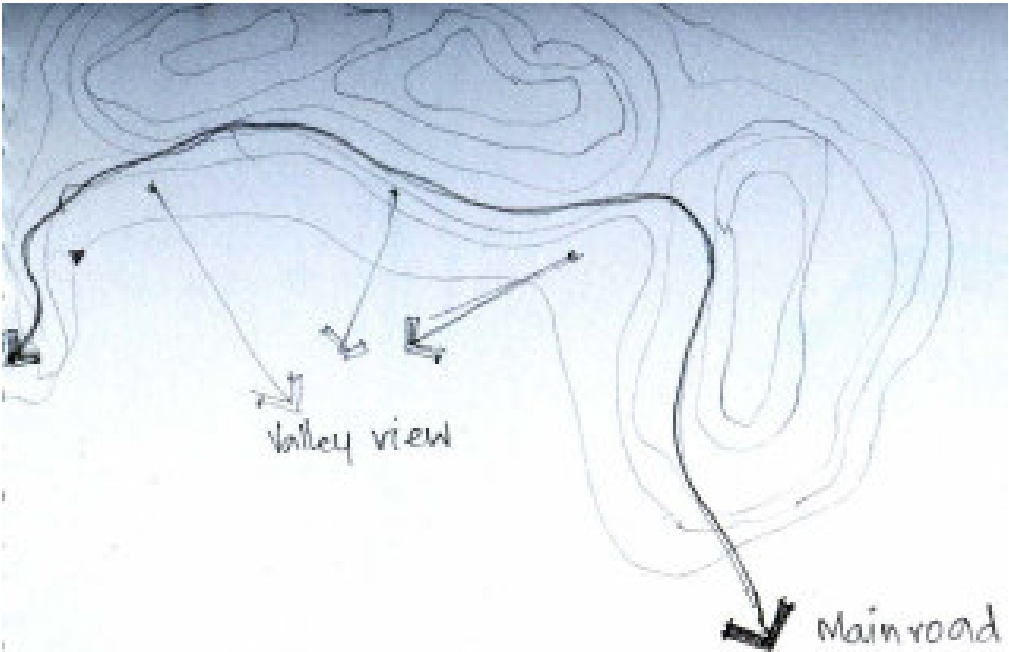
Abstract Site Section- Design



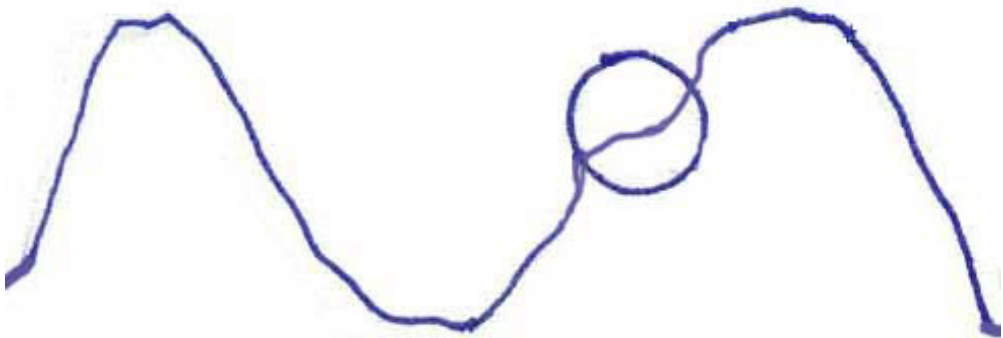
Details of Design components

Spur Locations:

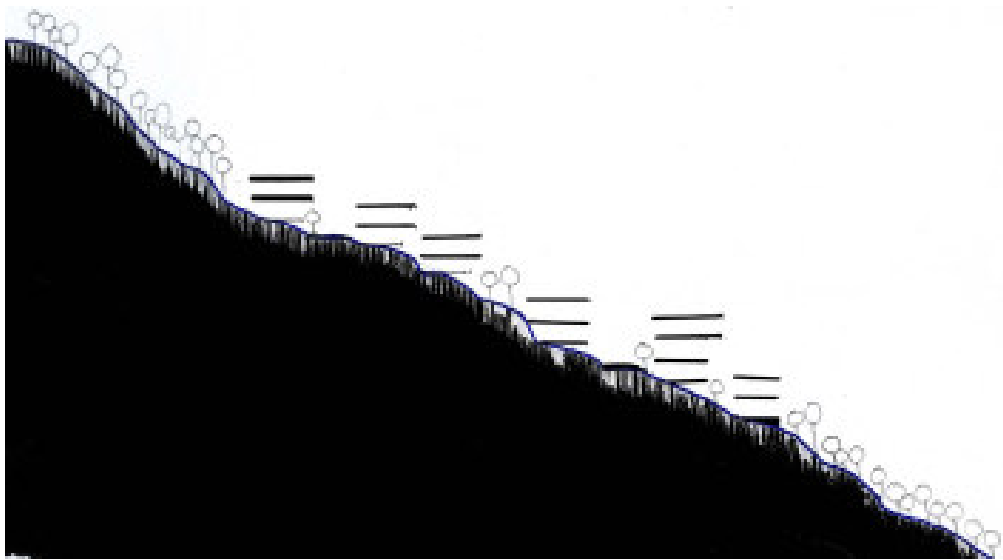
The important aspect of Great Views towards Valley and Snow peaks makes these location special. Hence the Conception was made to highlight the natural views. The Urban nodes and Settlement pattern should acknowledge these factors in first priority as well as to enhance the quality of spaces with in it.



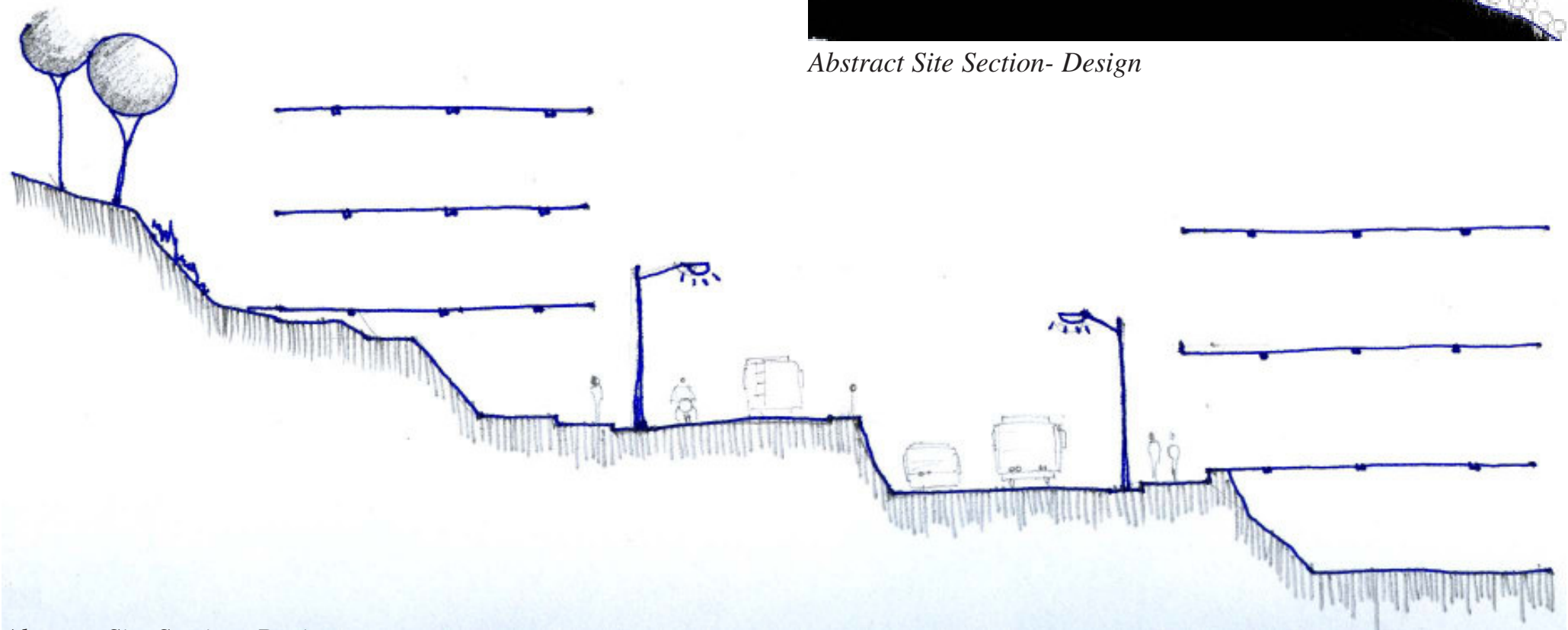
Abstract site and Region



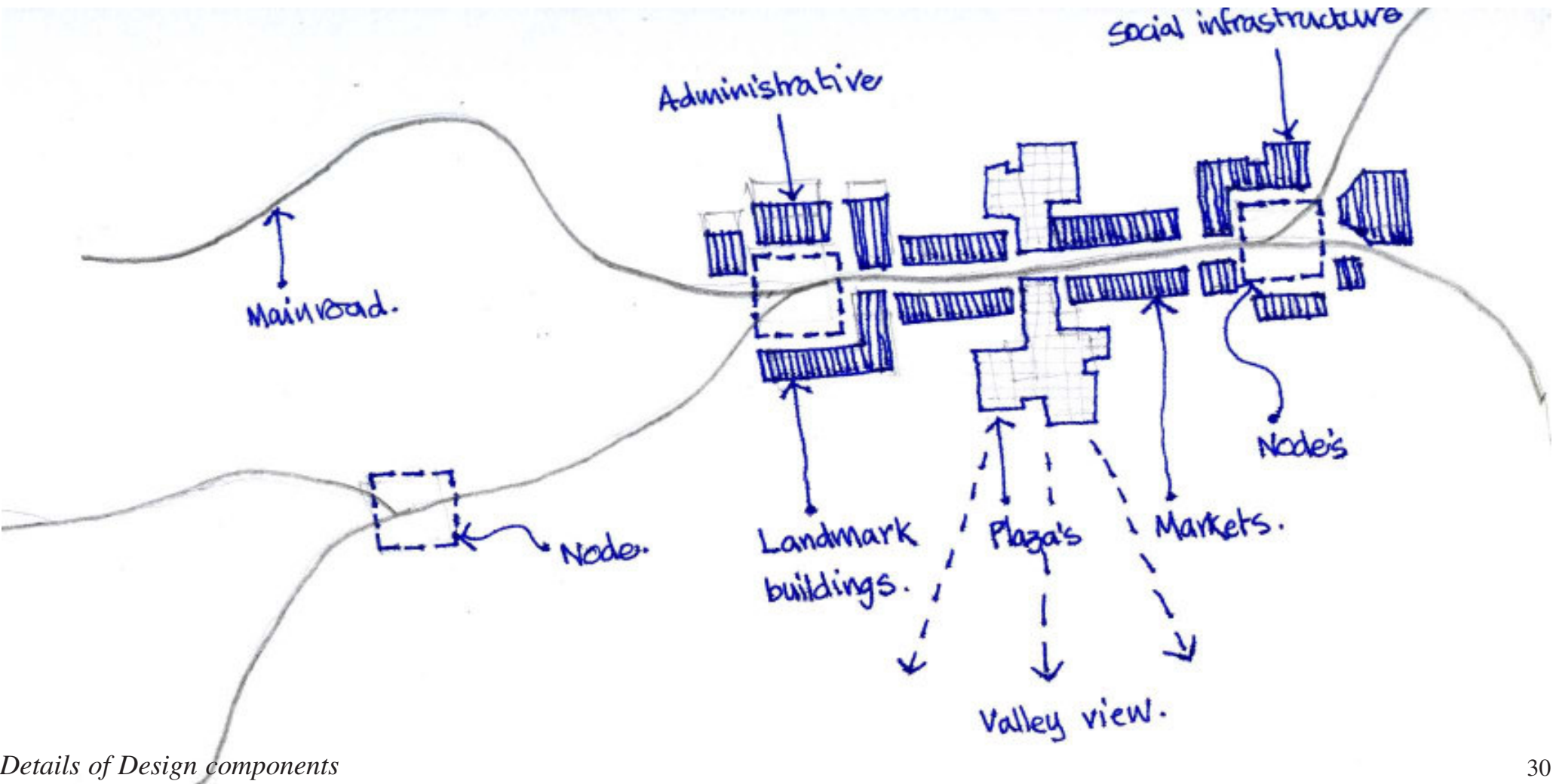
Location



Abstract Site Section- Design



Abstract Site Section- Design



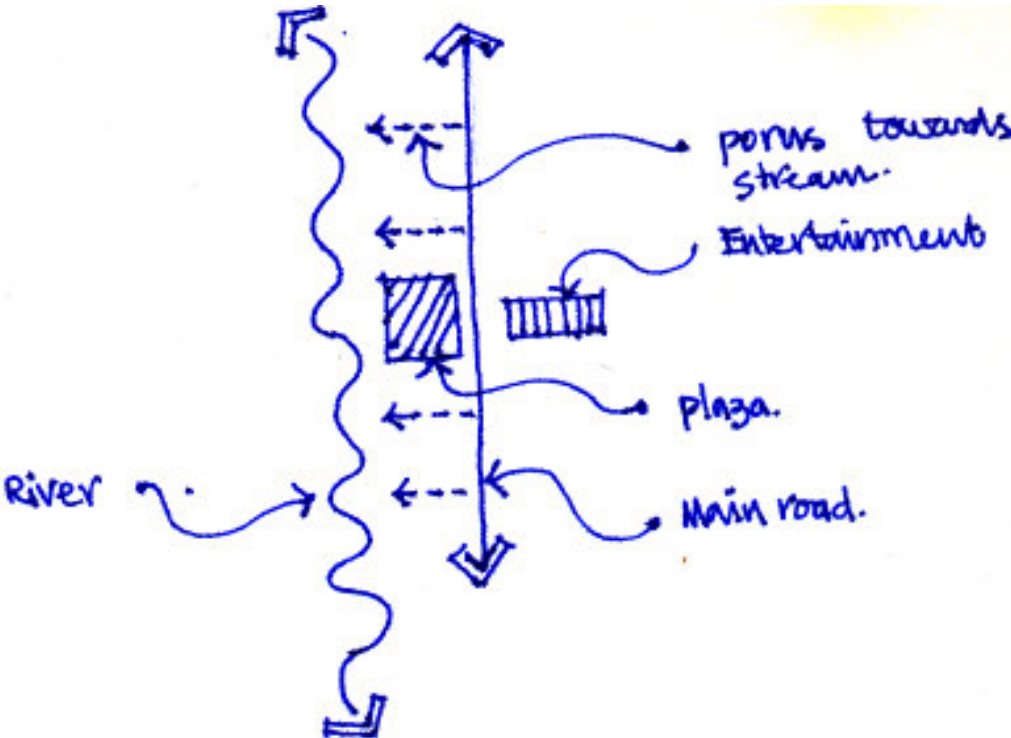
Details of Design components

Gap Locations:

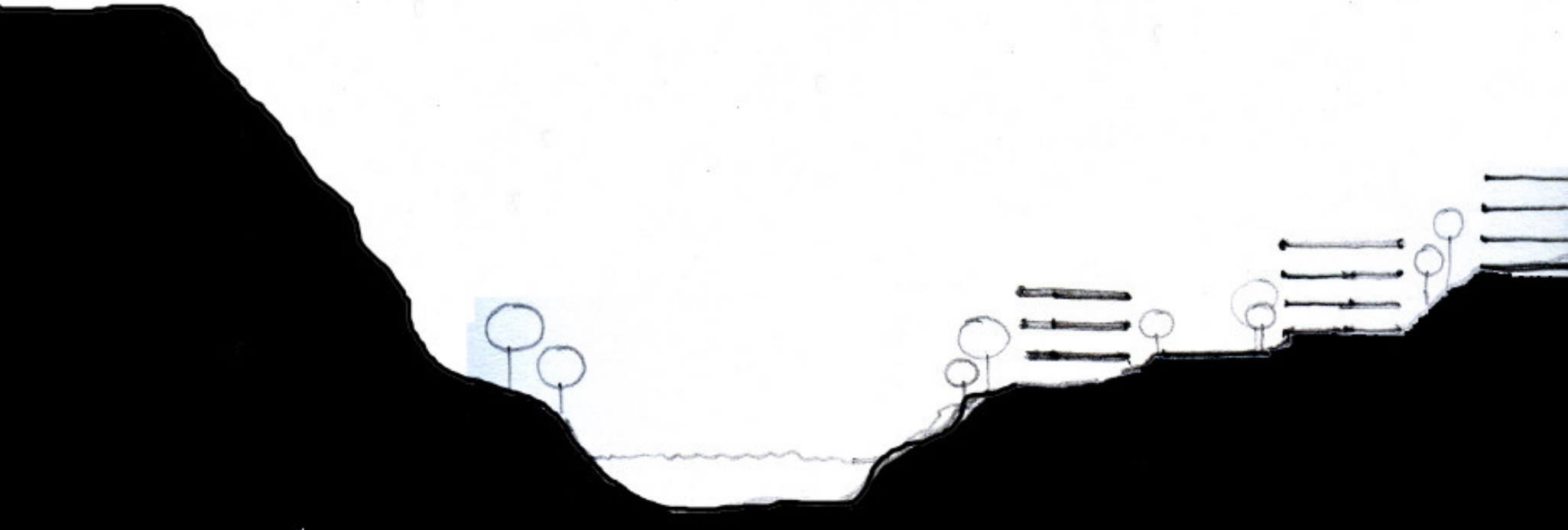
The asset of these kind of location is the adjoining river streams which are extremely sensitive and also sacred to the Himalayan regions. So to enhance this, layout should be sympathetic towards the water streams. Urban nodes are extremely important in making the identity of the places.



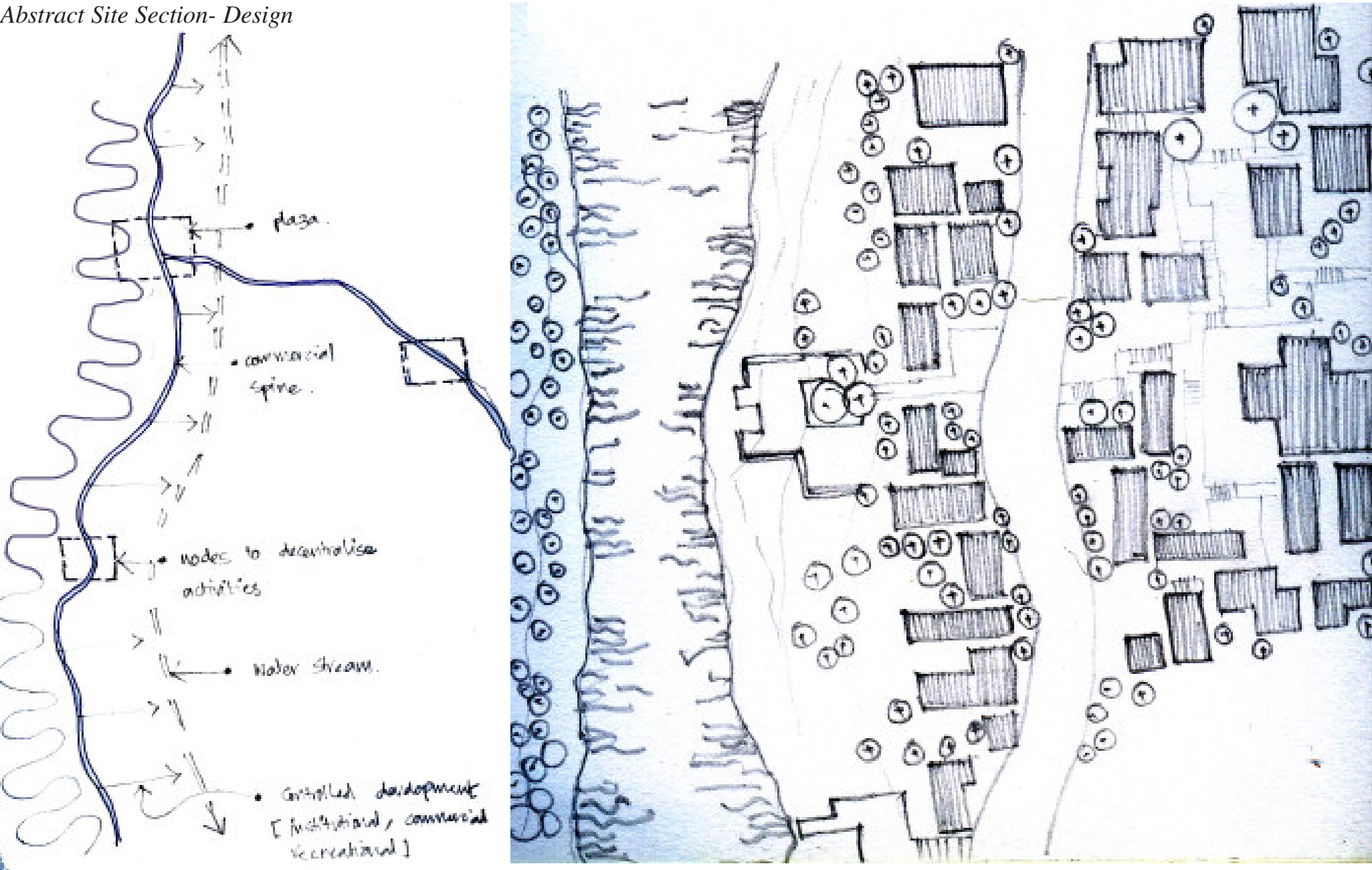
Location



Conceptual Design



Abstract Site Section- Design



Details of Design components

The idea of giving abstract design principles for a different locations is to highlight the potential of the site character in truly architectural aspect. This internally helps in making the better spaces for communities to live together in harmony with the surroundings. Most of the cases, buildings can be densified in the major axes to intensify the activities. But care has been taken to accommodate the space for parking, urban activities like Public gatherings, meetings, cultural shows, sporting activities etc. The technical aspects in building up the architecture is negotiable to suit the landscapes. But it has to address the problems of earth quakes, land slides, high density and water management. Use of local material has to be encouraged to control the high-rise developments in hill regions.

Development process should go hand in hand with the individual and community participation, to control the rapid mass development programs which will be threat to the common man and society. The successful institutional sectors in Uttaranchal state can be put in for the building up the hill capital.

Let people build the capital with minimum restrictions like, 1/3 of land for building foot print, 1/3 of vegetation cover as setbacks, 1/3 of land for water management and maximum section of Four stories in habitable spaces. For various land uses like commercial and institutional can be negotiable according to the site conditions.

Conclusions:

Capital city is the prime city and being the city of Principal importance, its location and planning requires emphasis from both the academicians as well as the decision-makers. An appropriate location of the state Capital becomes important for the social, cultural, political and psychological, intuitive or political decisions, as a planner and designers it should be useful to apply the logical principles for balanced regional development. A strategic planning done by planners for new capitals would be economical and efficient to plan for a well-sited State Capital with respect to the region. This would further aid in planning and design of such cities in the long run, rather than compromise solutions for arbitrarily selected locations. Phenomenon of Capital locations is irreversible over a short span of time and it becomes the responsibility of planners, designers as facilitators in decision –making for a viable long term decision instead ad hoc provisions to satisfy the immediate requirements.

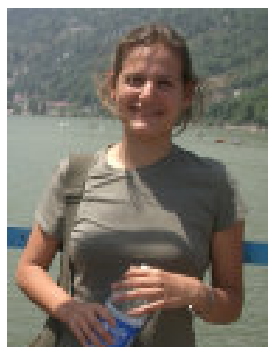
References:

1. Vikram.B. Bhatt, [1995], *Resorts of the Raj, Hill Stations of the British India*, Mapin Publications, Ahmedabad.
2. Nutan Tyagi [1991], *Resorts of UP Himalayas*, Indus Publications New Delhi.
3. Thomas R Metcalf [2005], *Forging the Raj, Essays on British India in the heydays of Empire*. Oxford Publications New Delhi
4. KB Jain, *Hill Settlements Kumaon and Nilgiri*, CEPT Publication Ahmedabad.
5. CA Bayly Rulers, townsmen and Bazaars , Oxford
6. Ramchandran , *Urbanisation and Urban Systems in India* , Oxford
7. Champaka Laxmi, *Trade, Ideology and Colonization*, Oxford
8. Anthony D King[1976] *Colonial Urban development: Culture and Social Power and Environment*.Routledge Press London
9. AJ Parsons [1988], *HillSlope Form* Routledge Newyork.
10. Mukherjee.R.K, [1955] *The Culture and Art of India*, Allena dn Unwin, London,
11. Kennedy, Dane. [1996], *The Magic Mountains: Hill Stations and the British Raj*. Berkeley: University of California Press.
12. Nora Mitchell (1972) *The Indian hill Station: Kodaikanal*, The university of Chicago, Dept of Geography, and Research paper no 141.
13. Taneja. K. L, (1971), *Morphology of Indian Cities*, NGSI i, Silver jubilee Publication. Varanas
14. Brush E John, (1962), *The morphology of Indian Cities, in India.s Urban future*, ed. By Turner, Oxford University Press, Bombay.
15. Arjita Bansal, (2002), *New Capital for Uttaranchal: identification of locational criteria and their application to the case study area*, Published paper in 52nd NT and CP, Shimla. IITP.
16. Randhawa M S, (1983) *a History of Agriculture in India*, vol3 Indian council or Agricultural Research New Delhi.
17. Prabhu, Darwar (1981), *A Study in Indian Urban Landscapes*, Bombay Geographical Magazine.
18. Kandari O.P (2001), *Garhwal Himalaya, Nature, Culture and Society*, Trans Media Publications, Srinagar.
19. Dewan M.L (2005), *Uttaranchal, Vision and Action Programme*, Concept Publishing Company, New Delhi.
20. Mehta G.S (1996), *Uttarakhand, Prospects and Development*, Indus Publishing Company, New Delhi.
21. Sarika Mitra, (2001),*Uttaranchal, Decentraliztion of a capital city's function*, Unpublished Thesis, SP, CEPT University, Ahmedabad.
22. Rajiv Rawat, (2005), *Capital City Relocation:Global-Local Perspectives in the Search for an Alternative Modernity*, Unpublished Paper, York University, Toronto.

Web Sites:

1. www.ua.nic.in
2. www.terraserver.com
3. www.mapsofindia.com
4. www.flonnet.com
5. www.sscnet.ucla.edu
6. www.countrystudies.us/india
7. www.eia.doe.gov
8. www.indianngos.com
9. www.indiatogether.org
10. www.rlek.org
11. www.bostonglobalaction.net
12. www.goidirectory.nic.in
13. www.unu.edu

Report by :



Emmanuelle. Pedetour,
Town planner,
French Institute of Urbanism
Paris.
pedetour2000@yahoo.fr



Ashok.Bhairi,
Architect &Urban Designer,
CEPT University, Ahmedabad.
India.
ashokbh@gmail.com